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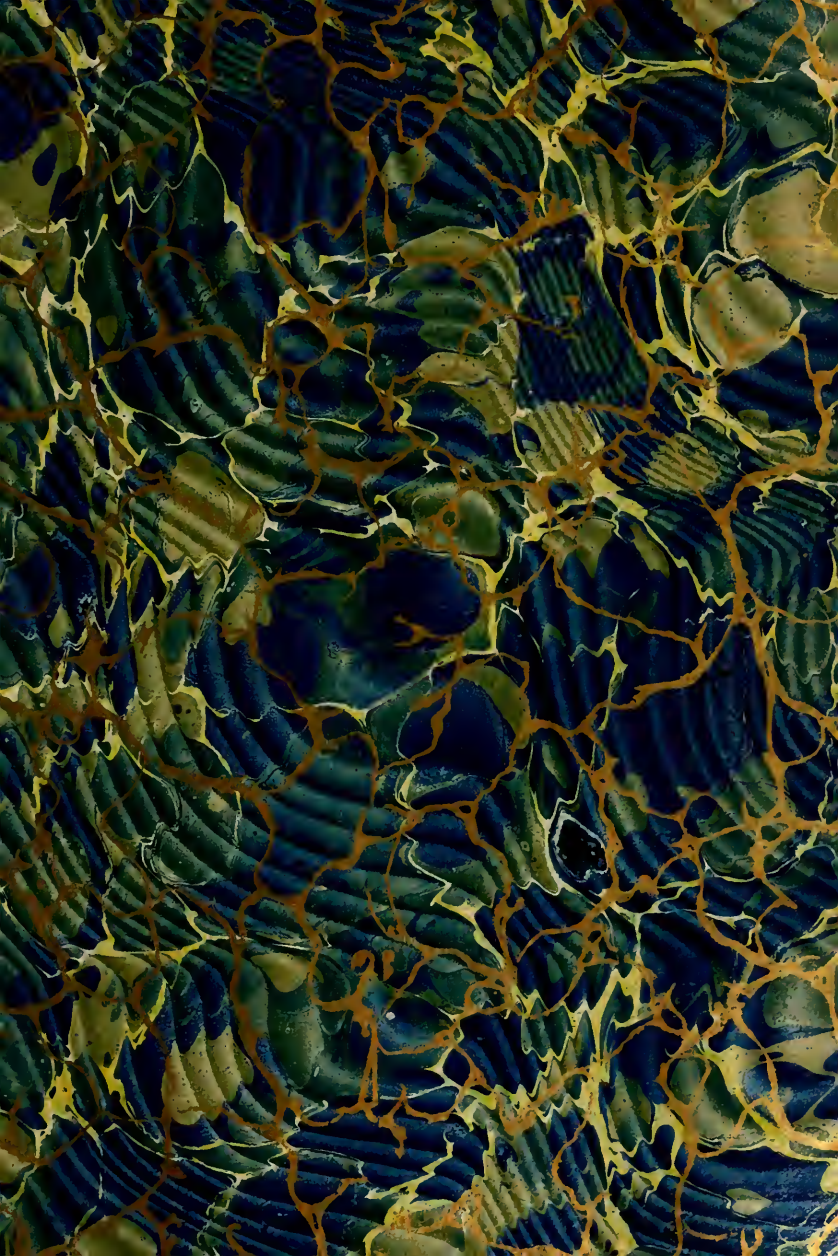

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EDITED BY
CHARLES A. BENNETT

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INDEX.

[Names of contributors of articles are set in SMALL CAPITALS. (A) indicates an abstract of a paper printed in the report of a meeting of an association.]

Academic Work and the Shop — Their Relation and Correlation — William C. Holden, 19.

Art, Manual Training, and Nature Study in Education (A) — J. Liberty Tadd, 38.

Associations — Connecticut State Teachers' Association, Report of New Haven Meeting, 108; Eastern Manual Training Association, Report of Cleveland Meeting, 38; National Educational Association, Department of Superintendence, 168; National Educational Association, the Report of Charleston Meeting, 45; New England Association of Metal-Working Teachers, Report of Springfield Meeting, F. W. Turner, 172; Northern Illinois Teachers' Association, Moline Meeting, 236; Western Drawing Teachers' Association, Report of Rock Island Meeting, 232.

Bates, R. Charles — Possibilities of Manual Training for Moral Ends (A), 169.

BENNETT, CHARLES A. — An Experiment in Wood-Turning (Ill), 155.

Bibliography of Manual Training, 238.

Brevities — Boston, 55, 115, 177; Canada, 56, 118; California, 57, 117, 178, 245; Chicago, 248; Connecticut, 242; Illinois, 185, 247; Massachusetts, 115; Michigan, 120; Minneapolis, 177; New York City, 179, 242; Ohio, 180; Philippine Islands, 246; Wisconsin, 119.

BRYANT, GEORGE H. — Recognition of the Trade Idea in Manual-Training Courses of High-School Grade, 200.

Carley, Ira M. — The Value of the Sloyd Idea as a Basis for Educational Manual Training (A), 40.

Clark, Ida Hood — Sewing as Related to Manual Training (A), 43.

Crawshaw, F. D. — Watson's Small Engines and Boilers, 64.

DANIELS, JOSEPH F. — Library Handicraft at Greeley, Colo. (Ill.), 89.

Davis, Walter W. — The Development of Muscular Power (A), 43.

DEAN, ARTHUR D. — An Experiment in Teaching Trades at Public Expense, 143.

Design, Constructive, in Woodwork, II (Ill.) — William F. Vroom, 25; Structural, The Relation of Nature Study to — James Hall (Ill.), 85.

Development of Muscular Power, The, (A) — Walter W. Davis, 43.

DEWEY, JOHN — The Place of Manual Training in the Elementary Course of Study, 193.

Domestic Science in Chicago, The Progress and Aims of — Henry S. Tibbits, 138.

Editorials — Dr. C. Hanford Henderson, 123; The High School *par excellence*, 251; The Manual-Training Teacher's Opportunity, 187; The Trade-School Question, 60; Value of Manual Training to the University Student (Testimonies from College Presidents), 121.

Education, The End of (A) — William DeWitt Hyde, 109.

Effect of Moisture on Wood, an Instrument Capable of Showing the (Ill.) — W. W. Murray, 184.

Forestry, Lumbering, and Wood, An Outline of Ten Lectures on — John C. Miller, 96.

Forging, The Decorative Side of a Course in (Ill.) — William C. Stimpson, 214.

FOSTER, EDWIN W. — Leaf-Forms of Our Common Broad-Leaved Trees (Ill.), II, 31; III, 100; IV, 163; V, 224.

Frederick, Frank F. — Wilson's Freehand Perspective, 126.

Grammar-School Courses in Manual Training, Some Observations on — Daniel Upton (A), 41.

Griffith, George — Cost of Manual Training (A), 171.

HALL, JAMES — The Relation of Nature Study to Structural Design (Ill.), 85.

Hand-Loom, A — (Ill.), 247.

Hand-Work in Education, The Place of (A) — Clara I. Mitchell, 234.

HENDERSON, C. HANFORD — The Manual-Training Outlook, 65.

HENDERSON, CHARLES R.—The Manual-Training School as a Factor in Social Progress, 1.

HOLDEN, WILLIAM C.— Academic Work and the Shop, Their Relation and Correlation, 19.

Howe, Charles B.— Pupil's Latitude in the Choice of Models, 112; Treatment of Blue Prints, 112.

Hyde, William DeWitt —The End of Education (A), 109.

Ideals of the Schoolroom, The — C. M. Woodward, 186.

Industrial Education, A Study in — Albert R. Robinson, 10.

Industrial Training as a Social Factor — Frank A. Manny, 129.

Kendall, F. W.— Schoolroom Bench (Ill.), 112.

Keyes, Charles H.— Relation of Manual Training to Trade Education (A), 46.

KIDNER, T. B.— Manual Training in England, 207.

Leaf-Forms of Our Common Broad-Leaved Trees (Ill.)—Edwin W. Foster, II, 31; III, 100; IV, 163; V, 224.

Library Handicraft at Greeley, Colo. (Ill.) — Joseph F. Daniels, 89.

MANNY, FRANK A.— Industrial Training as a Social Factor, 129.

Manual Training, Bibliography of, 238; Cost of (A), George Griffith, 171; for the Ordinary High School, James H. Van Sickle, 76; in the Elementary Course of Study, The Place of, John Dewey, 193; in England, T. B. Kidner, 207; For Grammar Schools (A), Harris W. Moore, 108; in Normal Schools, Lee Russell, 12; Possibilities of, for Moral Ends (A), R. Charles Bates, 169; Relation of, to Trade Education (A), Charles H. Keyes, 46; Unrealized Possibilities in, Clarence S. Moore, 81; Value of, to the University Student (Testimonies from College Presidents), Editorial, 121.

Manual-Training Outlook, The — C. Hanford Henderson, 65.

Manual-Training School, The, as a Factor in Social Progress, Charles R. Henderson, 1.

Mason, J. H.— Reid's A Course in Mechanical Drawing, 188.

MILLER, JOHN C.— An Outline of Ten Lectures on Forestry, Lumbering, and Wood, 96.

Mitchell, Clara I.— Social Occupations (A), 233.

MOORE, CLARENCE S.— Unrealized Possibilities in Manual Training, 81.

Moore, Harris W.— Manual Training for Grammar Schools (A), 108.

Murray, W. W.— An Instrument Capable of Showing the Effect of Moisture on Wood (Ill.), 184; The Rochester Desk-Top, 240.

Parker, Francis W.— Industrial Training (A), 170.

Queries— Blue Print and Drawing Holder, 53; Desk-Top (Ill.), 240; Pupils' Latitude in Choice of Models, 112, 173; Schoolroom Bench, 112; Treatment of Blue Prints, 112.

Reviews — American Industrial Education — What Shall it Be? 190; Bartsch's Constructive Work, 63; Brochure Series of Architectural Illustrations, 127; Brunchen's North American Forests and Forestry, 64; Burrage and Bailey's School Sanitation and Decoration, 63; Davidson's History of Education, 188; Ham's Mind and Hand, 190; Holme's Course of Instruction in Wood-Carving According to the Japanese Method, 255; Lewis' Manual Instruction in France and Switzerland, 254; Manual-Training Number, Teachers College Record, 191; Manual-Training Schedule, The, New York City, 127; Manual-Training Syllabus, New York, 125; Parental and Reform Schools, Reports on, Chicago, 127; Reid's Course in Mechanical Drawing, 188; Selected Bibliography of Manual Training, 126; Trybom's Cardboard Construction, 62; Watson's Small Engines and Boilers, 64; Wilson's Freehand Perspective, 126; Wheeler's Woodworking for Beginners, 189.

ROBINSON, ALBERT R.— A Study in Industrial Education, 10.

RUSSELL, LEE.— Manual Training in Normal Schools, 12.

Sewing as Related to Manual Training (A) — Ida Hood Clark, 43.

Sisson, E. O.— Davidson's A History of Education, 188.

Social Occupations (A)—Clara I. Mitchell, 233.

Sociological Teaching in Elementary Schools (A)—Henry W. Thurston, 237.

Stimpson, William C.—The Decorative Side of a Course in Forging (Ill.), 214.

Tadd, J. Liberty—Art, Manual Training, and Nature Study in Education, (A), 38.

Thurston, Henry W.—Sociological Teaching in Elementary Schools (A), 237.

Tibbitts, Henry S.—The Growing Interest in Manual Training and Domestic Science, 249; The Progress and Aims of Domestic Science in Chicago, 138.

Trade Education, Relation of Manual Training to (A)—Charles H. Keyes, 46.

Trade Idea in Manual-Training Courses of High-School Grade, Recognition of the—George H. Bryant, 200.

Trades, An Experiment in Teaching, at Public Expense—Arthur D. Dean, 143; Shall They be Taught in Public Schools? Editorial, 60; Teaching, in Connection with the Public Schools (A), Charles F. Warner, 46.

Turner, F. W.—New England Association of Metal-Working Teachers, Report of Springfield Meeting, 172.

Upton, Daniel—Some Observations on Grammar-School Courses in Manual Training (A), 41.

Value of the Sloyd Idea, The, as a Basis for Educational Manual Training (A)—Ira M. Carley, 40.

Van Deusen, C. S.—Wheeler's Woodworking for Beginners, 189.

Van Sickle, James H.—Manual Training for the Ordinary High School, 76.

Vroom, William F.—Constructive Design in Woodwork, II (Ill.), 25; The Eastern Manual Training Association, Report of Cleveland Meeting, 38.

Warner, Charles F.—Teaching Trades in Connection with Public Schools (A), 46.

Weyh, Robert G., Jr.—Brunchen's North American Forests and Forestry, 64.

Wood-Turning, An Experiment in (Ill.)—Charles A. Bennett, 155.

Woodward, C. M.—Manual Training (A), 171; The Ideals of the Schoolroom, 186.

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VOLUME II NUMBER 1

MANUAL TRAINING MAGAZINE

OCTOBER, 1900

THE MANUAL-TRAINING SCHOOL AS A FACTOR IN SOCIAL PROGRESS.[1]

CHARLES R. HENDERSON,
Professor of Sociology, University of Chicago.

YOUR president has invited me, as an advocate of manual training in primary and secondary education, and as a student of sociology, to present an argument for manual training from the standpoint of a sympathetic and interested layman. I am grateful for this honor and opportunity, since coöperation is so important in the furtherance of public welfare.

I.

Social progress may be defined from many points of view, as it includes many elements.

1. First of all may be mentioned new knowledge, especially in the highest and most complete form, science. Intellectual mastery of wider fields of the knowable, in nature and man, is confined at first to the chosen few, the pioneers on the frontier of the world's vision, usually specialists in some limited area of investigation. But the specialist is not so much possessor as holder in trust for mankind of the new-found treasures. Economic gain, riches or income, fame's golden invitation, honor's coveted rewards, lure the secret from the discoverer. And one must hasten to announce his discovery, since a host of masters are eagerly searching for the explanation of some mystery which baffles the rational nature. Darwin and Wallace, on opposite sides of the globe, declare the truth of natural selection in the process of evolution in the same year, and only a chance letter of Darwin to Asa Gray establishes his priority. If Darwin had failed, Wallace would

[1] Read before the Eastern Manual Training Association, Cleveland, O., June 30, 1900.

have enriched the world, and if Wallace had failed, another torchbearer was at hand. Science is not poor in genius, in capacity for taking pains, in patient and courageous speculation. Any man who is master of his own department, who is modest and humble enough to labor long at a certain point, may hope to enlarge the borders of science. The age of encyclopædic learning is gone, the age of the coöperator is ours. The individual is the world's benefactor only as he consents to join his life to the great world's life and accept a narrow sphere which is morally grand only as it is part of the tremendous whole. Thus social progress means the advance of science by the pioneers on behalf of all ages and all humanity.

2. Hand in hand with science travels the progress of the arts, the technical processes and tools by which the forces and materials of nature are made to minister to social desires, to satisfy human wants. Man must have food to nourish the body, clothing to protect from the weather and satisfy æsthetic wants; houses for shelter, warmth, and beauty; furniture to provide comfort and luxury; trains for travel; lines of communication; printing-presses for publication; and tens of thousands of devices to serve the multiplying needs of complex civilization. Inventions not only gratify human wants, but stimulate them. The shop window in which a new form of beauty or a more agreeable means of comfort is displayed awakens new wants, and fashion by social imitation then takes charge of the process of diffusion. By tools, hand-driven or steam-driven, man subdues nature to his uses, and invention, skill, and training are essential to making them serviceable.

3. The history of the fine arts shows that it is in close and vital connection with the useful arts that free art has come to life and expression. The savage who acquired skill to shape the handle of a stone knife or hammer was on the way to adorn it with pictures of the animals he slew for food or copied as symbols of worship. Man must dwell within walls which are strong to protect; but the same training which enables him to shape the stone for protection gives him power to carve an image. The Italian goldsmiths felt in their fingers, trained to exact forms, the inspirations of the Renascence, the rejuvenescence of Greek art. It is in the consciousness of power over materials, in skill to execute, in ability to make nature a manifestation of mind, that art arises. We call the fine arts "free," and in them freedom is felt. Gradually with technical training the rude and shapeless block shows forth the human form divine; the arms are no longer fast by the huge

body; gesture becomes free, pose graceful, and drapery floats about the form as image of the human fancy. Thus another factor of social progress enters into history. The human spirit evolves art by coöperative actions, by traditions of culture, by lessons improved upon, by advance of student beyond his master with help of the master.

4. Spiritual insight is a factor in social progress. Under this general designation one may place the contributions of philosophy, religion, poetry. The universe is mastered by reason in increasing measure; unity is revealed above chaos; life thrills all particles where the former ages saw only "dead matter;" all objects are thought in their relations and connections. The spectroscope reveals the likeness of the elements in earth and star; the telescope brings more distant systems into the swimming field of vision; and a grander basis is constructed for theologies and ethical systems. Speculation works with reality, and the poetic spirits delve with artisans in the same wood and iron and stone.

5. Social progress means improved bodies, brains, and mental capacity. It may be questioned, and it is disputed, whether the best brains of classic Greece have been surpassed in modern times. There are competent men who declare that man reached long ago the limits of physical perfection; that the erect position once attained, no improvement there is possible; and that no larger brains can be produced without sacrifice of mothers. Admit, for the moment, that the race will never go beyond the present in size of brain, in number of brain cells, in depth of convolutions, in fineness of nerve texture, there still remains the task of bringing up the average to the best. Social progress will imply, for a long time to come, by birth, by breeding, and by selection, the production of more perfect physical forms and corresponding capacities to acquire.

6. Social progress means the socialization of all these elements of well-being which have been named. This is at least the democratic ideal, the ethical working hypothesis of our century.

7. Incidentally, social progress involves the diminution of social disease, physical deterioration, pauperism, beggary, vice, and crime. The advanced lines of society must drag along with them the camp followers, the malingerers, the degraded; and the more completely the number of these can be reduced by education, the more rapid will be the march.

II.

The end of education in relation to social progress.— All experience is in some fashion educational. Life itself is a school. But we are just now busy with the institutions in which a community expresses its will to unfold in larger ways the life of the young community yet plastic under the influence of the teacher. The school is the agency devised by the experience of mankind for the most speedy, economical, and thorough communication of the mental wealth of an age to its immediate successors. We ourselves have inherited and enlarged the traditions of knowledge, invention, and social organization. The school stands for the socialization and transmission of this treasure of civilization. The body of the sciences, the amazing improvements in technical processes for harnessing nature's matter and forces to the train of social prosperity, the literature of the world, the works of genius, the images of poets, the inspirations of idealist prophets, are given to the teacher for the sake of a growing community. The soul of each man looks out at many windows on a world of many aspects and voices. No window should be closed, none clouded and darkened by neglect or bigotry, not even by the bigotry of specialism masking as science, but untrue and unfaithful to its profession.

III.

The place of manual training in the ministry of social progress through education.— Each contribution to the welfare of mankind finds its dignity and value in coöperation, never in isolation. That which is popularly known as manual training is not a mere trick of the hand, something distinct and alien in the system of education. It is not a method of training mechanics for a particular craft by which bread and butter may be won. It does help that honorable purpose, but it is more. Perhaps those who affect to despise manual training as something fit only for the members of the "laboring class" are precisely those who most need its help to make them complete men. It can be shown that the educational principles which lie at the basis of manual training are essential factors in the unfolding of every human being, and also that the methods employed are valuable in their contributions to every factor which we have considered as making up social progress — new knowledge, industrial mastery of nature, art, insight, improved bodies, and full socialization of the spiritual wealth of mankind. It is on this basis that we can advocate the introduction

of the idea into all education, in some measure and at suitable stages of individual development.

1. The educational method which is called manual training is capable of adding to the sum of human knowledge; it is a tool of scientific discovery; it leads straight into the heart of the secrets of matter and force, of natural law. It shapes the instruments of investigation and makes them more searching and powerful. This is true of the improvements in the material instruments of science, such as microscopes, telescopes, and the cunning devices employed in the psychological laboratory. But it is specially true of the most important instrument of all — the human body. He who has from childhood been busy making eye reveal to hand, and hand answer to eye, in close and honest touch with material reality, gains a power and habit of exact observation which is the basis of discovery.

2. That manual training cultivates technical skill and shortens the path to those crafts which master the external world and supply the means of culture and comfort, is so patent and generally acknowledged that bare mention of the argument is sufficient. This argument alone would be enough to establish the claim for the universal introduction of the method into schools. Common-sense should prevent the ultra-spiritualist from despising that power to make wealth on which all the higher structures of civilization depend. It does not speak well for the judgment of idealists who declaim against the use of tools and machines at school on the ground that they are "materialistic." The poet would soon fall in a heap from his lofty heights, if he were not nourished and sustained by the crafts and industries. Theologian and musician, your fine lady and your mincing fop, are all alike kept breathing in this world because of the useful arts.

Those familiar with the recent history of industrial processes, from cottage loom to huge factory with steam-driven machinery, with rapid transformations, swift change from one form of machine to another, and consequent necessity for readaptations of workmen to new tasks and processes, are seeking to show society that these changes have made the apprentice system obsolete as a reliance. The home in a manufacturing town is no longer a school of fundamental ideas and movements. The highly specialized processes of the factory tend to make the man a mere attachment to the machine, and even to the miserable fragment of the process which some dignify with the name of a "trade." Back of all special processes there are forms of tools, simple movements of eye and hand which are to all complex machines

and processes what the alphabet and the art of reading are to literature, the key to all knowledge and all forms of skill. It is manual training alone that can once more raise the man above the machine and enable him to move at the command of progress in the arts from one occupation to another. Manual training is emancipation from serfdom to the particular trick taught in an hour and made useless again, often at critical times in the career of the workingman, by some slight improvement in machine or technique.

3. Popular prejudice in respect to the art side of manual training should be corrected. Perhaps it is safe and honest to go farther at this point and suggest that many of the advocates and teachers themselves need to modify and clarify their ideas at this point. If ever art is to be a sincere part of community-joy, it must be democratic. Class art is snobbery, the glorification of narrow ideals. Only when beauty is everywhere is it securely anywhere. Boulevard æstheticism is mere bigotry, luxury, and it mistakes expensiveness and exclusiveness for beauty. Art without human love is not lovely.

We must listen to Ruskin and Morris, prophets of a coming age. Two doctrines they taught, for which the world is rapidly coming to be hospitable; first, the workman must have pleasure in his work; secondly, the world must share the pleasure of the workman in the use of the product. Here is not time to work out the thought contained in these propositions. The technical difficulties are formidable, the economic obstacles are still mountain-high. American art is yet too much an exotic for us to value it at its true worth. Competitive industry has most of the field, and it fills our eyes with things cheap and often vulgar enough. It is still believed that machines can do all things and that hand-making (true manufacture) is antiquated. It is still true that the wage-worker is too poor to buy furniture and decoration that are not made very low in price. The vision of Morris seems so unreal and impracticable. So we go on beating the world in machinery and stealing our models from older countries where art is rooted deep, and where workingmen can visit the public galleries where the works of great masters inspire. But the case is not desperate. Every year we throw more brute work on the machine and take it off man. We are not yet in that paradise where disagreeable, dirty, and hurtful functions can be carried altogether by unfeeling steel, wood, and glass, but every year brings us nearer to the sight of that goal. This liberated energy will take the direction of individual creation of forms of beauty in endless variety, and men in cottages will be able to take pleasure in the things they make and buy.

It is in the workshop and the manual-training school that art will find its votaries. When use has been met, then a higher use will be served. You will help the world to feel that a piece of furniture, a utensil, a book, a house is useful, not only as it ministers to comfortable sensation, but also to the taste for beauty.

4. It may be more difficult to justify the argument that the educational method which passes under the name of manual training is fruitful for spiritual insight. Can social progress be aided up to the very heights of worship and faith and hope and love by these dusty benches, these grimy tools, these commonplace processes of the school? If not, something is seriously evil in our conception of what manual training means.

The purpose of life must be revealed in life and by living, or it cannot be revealed from outside. There was once on this earth One who gave eighteen years of a brief life to the carpenter's trade and only three more to public prophecy. It was on the basis of a manufacturer's craft that the divine life revealed itself. If love of truth is ever to become a national instinct and habit, it will be learned by making objects of daily use with such accuracy and fineness that the truth is in every measurement and line. George Eliot in *Adam Bede* has depicted to us the artisan who sang at his daily work:

> Let all thy converse be sincere,
> Thy conscience as the noon-day clear,
> For God's all-seeing eye surveys
> Thy secret thoughts, thy works, thy ways.

Modern poetry is written for the people and not merely for the courts of kings, and its notes are more noble and pure for their democratic feeling.

If the moral meaning of the universe is woven into things, if the ultimate reality is the soul of all reality, then must those who work with things come upon the great reality hourly. It is in the hermit's closet, in the recluse's cell, that morbid skepticism about reality grows like an insane dream. It is the close atmosphere of the solitary which stifles the spirit. In the joyous labors which constantly produce beautiful and honest work we are taught to interpret the law, "My Father worketh hitherto and I am working." Sanity and spiritual vigor are with those who train themselves to form wood and metal and stone into shapes which materialize the spiritual vision, the thought, the purpose which first traced the drawing according to eternal laws of mathematics and then took shape in things.

And so the Word had breath and wrought
With human hands the creed of creeds,
In loveliness of perfect deeds,
More strong than all poetic thought.

5. Manual training actually produces better bodies and brains than the routine system of education which makes the pupil a mere listener instead of a maker, an active and happy agent of creative impulse and power. Into this irritable world, into the cramped and crowded school-rooms, has come this new method of instruction which to an adolescent boy or girl is a deliverance from nervous strain and a means of exercise which brings health and sanity and power. Many an adolescent is saved from debasing vice, from brooding fancies, from unwholesome dreams of day, and wooed to sound and dreamless sleep at early hour by the work of the shop. Connect manual training with the movement for larger schoolhouses, ampler playgrounds, summer vacation schools, suitable physical culture in gymnasiums, and you will transform the stunted children of immigrants into taller, larger, stronger men and women, to whom useful toil will be a joy, and social coöperation be easier than a life of parasitism and brigandage. It is not necessary that cities should be the graves of mankind, if sanitary science is permitted to give law to councils, and the philosophy of education which you represent is accepted intelligently by boards of education.

6. I wish to make a part of my argument the familiar suggestion that manual training aids in socializing education. In many ways; but one in particular I will mention: by retaining boys longer in school. The discipline of hand and eye in relation to constructive work is appreciated by lads who hate books. They will swallow the bitter medicine of history and literature for the sake of two more years of tool-practice. It is a notorious fact that our boys escape too early from the environment of the school, and they go out at an age when the studies which teach social relations have just begun. Thousands more will remain to the end of the high-school course if the method of teaching comes into line with their own wise instincts, if they can be making things, and not merely sit passively until they are stupid and fat with stuffing. There will be little need of compulsory school laws, enforced by modern beadles in guise of truant officers, if the manual-training idea once takes full possession of our public schools. It has been found in settlement work that boys will become tired of play sooner than of shop-work under a wise and inspiring teacher of manual training. It is actually easier to teach them than it is to amuse them.

7. Crime and pauperism are frightful diseases in modern urban life. Education can never take the place of social selection by elimination of the incurable and unhelpable defectives, although even with defectives segregated from the family life manual occupation is an essential part of entertainment and of self-support. But much of crime and pauperism is the result of defects in our methods of education. Young men steal because their hands have not been trained to useful and productice industry. The feeble beg because they are not capable of making things that will sell. Skill can generally find a market. "The world is full of misfits, and misfits are always cheap." Reformatories make constructive work the central factor in their system of reform for delinquents. But every superintendent of reformatories in the country will tell you that he has come too late, at least for the best results. The mischief has been done before the act which sent the boy to a reform school. When will our honorable boards of education save enough time from "political pulls" to give themselves earnestly to building up modes of instruction which will save our country from the shame and loss and misery of much pauperism and crime ?

Fellow-teachers, we have gone over the chief factors of social progress, one by one ; we have sought to show the relation of education and school to social progress ; and we have touched for a moment on the service which manual training has rendered, and promises in larger measure yet to render, to the cause of human welfare.

A STUDY IN INDUSTRIAL EDUCATION.

ALBERT R. ROBINSON,
Principal of English High and Manual Training School, Chicago, Ill.

IT would be mild pessimism to say that the world moves slowly, but when we know that it is nearly half a century since Herbert Spencer gave to the world his convincing essay entitled *What Knowledge is Most Worth*, we must add another word to the echo and say: "The world moves very slowly."

The monastic idea of the aim of education still holds its tenacious grip on the throat of our programs of study. We proudly disclaim that it is the intention of our schools to prepare the student for his real life-work and say it is the object of the school to develop the mental powers of the child. "Education for culture" and "Education for developing the mind" are favorite catchwords with many who are totally unable to define what these phrases mean.

In this country we have no privileged class which by birth and inheritance is able to devote its time solely to culture and mental development, but all must join in the active work of some calling the pursuit of which demands special preparation. The first great duty of the state is to prepare its wards, the people, for citizenship in such a way that they will be of the greatest mutual benefit. No one can fill this ideal of citizenship unless he has the opportunity and ability to earn a competent living. What are our schools doing to put the mass of the people on the way to this ideal state? The work of the elementary school as a whole is doing this, but let us examine further in regard to the schools of a higher grade.

The special preparation offered in these schools fits the one receiving it for following one of the learned professions, that is, for some pursuit not engaged in, or dependent upon, the production of any material thing. These professions are the law, medicine, the ministry, and teaching. According to the United States census of 1890 those engaged in the professions named in the state of Illinois numbered as follows:

Law	5,769
Medicine	6,207
Ministry	5,066
Teaching	23,612

This gives a total of 40,654 persons out of a total population of 3,826,-351 who are engaged in work for which our schools offer a degree of preparation.

By the school census of the state for the same year there were 1,690,171 persons in the state under twenty-one, leaving 2,136,180 who had attained an age when one is supposed to be competent to choose and follow some independent occupation.

From this we find that about 1.9 per cent. of the population have been educated for their special work. These figures are in excess of the facts in the case, for anyone who has even a moderate acquaintance among professional men knows that a large proportion of them have taken no course of study beyond the elementary school, except such as was offered in the professional school where they received their necessary professional training.

There is no intention in this paper to decry education of any kind, but it is hoped that the day is at hand when the programs of study in our schools will be broadened and enriched, not by the introduction of more Latin, more Greek, more mathematics, or more literature, but by placing before the students an opportunity to learn the facts and forces that go to make up the great work-a-day world.

More than 98 per cent. is far too large a portion of the people not to be materially helped by an institution that is established by the people, maintained by their money, and supposedly conducted for their benefit. It looks strange that any part of our public-school system, which is the one distinctly communistic feature of our government, should be devoted to what looks like class education.

It is safe to say that, if our schools above the elementary grade offered programs of study in which the work of active life was carefully coördinated with study of a purely mental character, many of the social problems that now trouble us would soon find a solution. Purely industrial schools are no more to be desired than those wholly devoted to mental work. Each of these defeats the ends of education, which is to make a full, round, independent manhood.

MANUAL TRAINING IN NORMAL SCHOOLS.

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WHILE manual training, as a means of general as well as special education, has developed and spread with rapidity and steadiness during the last decade, taking its place in all sorts and all grades of schools, it has only recently found a secure footing in normal schools. Ten years ago, aside from drawing and clay-modeling, there was but little instruction attempted in the subject. The burden of academic and professional work was too great, and the value of handicraft too little understood to warrant its introduction.

A notable change has taken place in the last few years, however, and there are now few normal schools in the middle and eastern states that do not make some attempt at a course in manual training, while in not a few the new branch is prominent and well sustained.

It seems to me that this change has been due to the general popularity of the subject, or to legislative encouragement, rather than to any clear idea of its value in the training of teachers. From an examination of the work and courses in a number of normal schools, one gathers that the place of manual training is not very well defined. In some the work is distinctive, adapted to the age, sex, and aims of the pupils, but often it is either a slightly modified form of the high-school course, or an adaptation of the practice given to young men in polytechnic schools, or exercises in sewing and cooking.

In a new subject like this, diversity of treatment is a good thing. It is only by variation in method, by trial and error, that such a scheme of work can be produced as will meet given conditions. Where these are not well understood, tentative plans will have to be tried and modified again and again, each change bringing more perfect adaptation. But it seems to me that so great a diversity as exists here is hardly compatible with the similarity of conditions which normal schools present.

The average age of pupils at entrance to the normal school is, I presume, not far from eighteen years. In the country as a whole about three-fourths of these are women; in the eastern states a much larger proportion.

The attainments of these pupils are, as a rule, somewhat below those of the average high-school graduate, though in some states graduation from a high school, or its equivalent, is a prerequisite for admission. The young women are, and always have been, bound by the traditions and limitations of their sex. This is quite right and desirable in general, but it is not in the line of the sort of training required to make successful teachers under modern conditions. In speaking of these limitations I am not finding fault, but am simply stating a fact, the result of which is that these young women have gained but a narrow experience, and that their acquaintance with their environment is superficial. One has only to watch the behavior of boys and girls when at large, to see how much that is eagerly seized upon by the former, as material for self-education, is quite overlooked and disregarded by the latter. These are not conscious, purposeful acts on either side; they appear to be quite instinctive. Boys, as a rule, are on the alert for everything that comes in their way; girls only in a limited range of activities and interests. I happened lately to watch the flushing out of a street hydrant when the children in the street were on their way to school. In four minutes from the start eighteen boys were gravely looking on, and four more, who had been studying rivers in connection with physical geography, were following the stream of water as it ran along the gutter. More than twenty girls passed by during the operation, but, so far as could be seen, not a single one paid the least attention to it. It was not in their line. In the practice-teaching in the model school at Truro we frequently have cases where boys, from their wider experience, are able to confound or correct, as to matters of common observation, the pupil-teachers from the normal school.

The young men who attend normal schools, while not subject to precisely the same limitations as young women, seem quite as often to be bound by the "text-book habit" to the text-book point of view, and thus to have lost the inquiring spirit and the observing faculty of their earlier youth.

The subjects upon which most stress is laid in normal schools are necessarily those of the curriculum of the common schools of the region. The study of methods of teaching these subjects and practice in teaching them take up the greater part of the students' time. Purely scholastic work in psychology, history of education, and the like also receives attention, and in many schools laboratory and field work in natural science has a place. In fact, the normal-school course

uses nearly the same subject-matter as the other schools do, the treatment and point of view being, of course, different. It will thus be seen that, though the training given in normal schools differs essentially and widely from that of high and grammar schools, yet the differences are, in a way, *specific* rather than *generic*. On its professional side it is distinctive, but in other ways it shows the same defects as the other schools do. In breadth of view, variety of interests, knowledge of surroundings, keenness and ability in observation, power of generalization, resource and enterprise, the normal-school graduate may not be so much superior to the high-school graduate as, from the nature and importance of her calling, she might and ought to be.

In saying this, no reflection is made upon normal schools and their work. I well know the difficulties they have to contend with, and how impossible it is for them to give their pupils all they see to be desirable. Many, realizing the lack just pointed out, have invented special exercises, and by various ingenious means have tried to remedy these defects by broadening influences.

Another fact to which I wish to call attention has a considerable influence in retarding the transformation of high-school graduates into effective teachers. It is the wide difference which exists between the way a mere student regards a subject and the point of view from which the teacher must regard it. A certain college professor has said that when he wished really to know a subject, he organized a class and began to teach it. In many normal schools there is much scholastic work, with its accompanying reviews and examinations. This keeps alive the student attitude, and just so far tends to prevent that of the teacher from taking its place.

Where written examination is made the main test of fitness to teach, each scrap of knowledge, each subject, and even each teacher is regarded and estimated from the examination standpoint, and this habit becomes so ingrained as to be almost ineradicable from the student's mind. The value of the subject, practically or educationally, is lost sight of, its meaning perverted, and its place in the curriculum considered solely for its availability in making "marks." Where such a system prevails, the normal school is heavily handicapped at the outset. The pupil must be "born again," and a true point of view substituted for the false one.

It now remains to be shown how manual training may aid in correcting these defects. In order that there may be no misunderstanding,

it should be explained that the term "manual training" is here used in its wide sense to include all those operations in the sciences and mechanic arts which call for the exercise of manual skill, artistic sense, inventive ability, and knowledge of the reactions of one's environment. Thus, in a normal-school laboratory, a course in blow-pipe analysis, or in general chemistry, may be made the occasion or "vehicle" of exercises in manual training. The apparatus and methods would be left largely to the pupil, the teacher outlining the general method and furnishing only the raw material, so to speak. Anything like the complete apparatus found in the laboratory of a polytechnic school would be unnecessary, and even out of place.

For shop-work a great variety of exercises in the working of clay, plaster, cardboard, wood, and metals should be given, which would train the pupils in the directions indicated and give them that wider experience and interest which they need. Further detail need not be elaborated here. This must be left to the teacher, and varied to suit the needs of each school. Enough has been said to show the general scope and aim of the work.

The average school presents to the young teacher many problems more difficult than that of mere instruction. Perhaps it would be better to say that before instruction can profitably be given at all, more difficult things must have been accomplished. The teacher must gain the respect and confidence of the children and of the community. She must show herself courageous, truthful, independent, and self-respecting, must possess executive ability, be competent to do what she undertakes, eager to undertake whatever ought to be done, and, above all, interested in all there is to do. These qualities go to make up a character which is likely to succeed in any school. Of course, other characteristics are desirable or even necessary. The possession of these alone would not make a perfect teacher, but most successful teachers will be found to have them.

Manual-training exercises are of a nature to lead the pupil along a path of conquest in a new field from one seemingly impossible task to another; and, if properly graded, the successful accomplishment of each is a certainty. Nothing gives confidence and courage to young people like such success. As Emerson says, "every step a goal." The ability to use edge tools upon wood, for instance, so as to produce accurate and beautiful results, gives a start, a spirit of enterprise, a readiness to undertake difficult work of any sort. After two or three months of practice in the shop, when pupils have begun to acquire

some skill and mastery, I notice a distinct improvement in the way my classes take hold of other tasks. There is less dependence upon the teacher and upon each other, more of the heroic in their attitude, and of the quiet determination to do. That this extends to their after-work as teachers there is abundant evidence in the numerous applications made to me by graduates for advice and aid in starting new lines of work in their schools. To some extent the old, hide-bound traditions have been broken and the spirit of enterprise and innovation awakened.

High-school graduates are usually too closely tied to the text-book. Where, as in Nova Scotia, there is a prescribed course of study, with state examinations to determine advance, devotion to the text-book becomes well-nigh complete, and anything outside of it is looked upon as something almost unlawful. In manual training, and other laboratory work where no use of the text-book is possible, a corrective of this is found, and the pupil comes to see that there may be an appeal to reason or to experience as a higher authority than even "authorized text."

A person who has had a comprehensive and varied course in manual training acquires, as I have tried to show, new and wider experience and interests. When such a one goes into a community as a teacher, she is likely to take a more active part in the life and work of the people, and to have a more intelligent and sympathetic interest in their affairs. Nothing can be better for the school than this. It at once brings about a corresponding relation between parents and teachers, and an intimacy which is of great value in sustaining the school. It has also a more subtile and indirect effect upon both sides. The teacher, knowing the activities, interests, and peculiarities of the community, instinctively adapts her instruction to them, and the parents and children, on their part, feeling the teacher's friendly attitude, are more ready to aid and uphold her.

There is yet another way in which manual training may be of value to teachers, namely, as useful training to the individual. This is usually considered first in such discussions as this; but it seems to me of secondary importance to those already named. All arguments which hold good for the use of these exercises anywhere are of equal force here. They are so well known and so generally admitted that it is unnecessary to consider them in this MAGAZINE.

It remains to be shown why, with manual training in such vogue in schools below the normal school, its introduction into the latter is still considered desirable.

As a matter of fact, very few manual-training courses contemplate the giving of such work as is here suggested, to girls; exercises for them consist, and very properly, in cooking, sewing, and other domestic occupations. As for the boys, very few who take the courses in manual-training high schools attend normal schools at all. The college, the polytechnic school, or a trade is their goal. Again, a large proportion of normal-school pupils come from the country, and few country high schools can or do afford a special course in manual training. Moreover, normal schools are special schools, preparing pupils for a distinct calling, and their courses in manual training should be planned with this in view. Therefore a graduate of a manual-training school could pursue with profit a more comprehensive and philosophical course in the same subject in a normal school, and would gain more from it than if he had not had the previous training.

There is a utilitarian value in manual training for teachers, which is by no means unworthy of notice. In poor and scantily furnished country schools it is often a help to the teacher if she can devise and make the illustrative appliances she may require. It is always a good thing if she be able to direct her pupils in the making of such simple apparatus as will assist them in elementary science and nature study. Inventive ability and skill in manipulation are required, more or less, of every teacher, and manual training, as is well known, tends strongly to develop such capacity.

The course of manual training given in a normal school should comprise, under these considerations, a great variety of work in many different directions. In addition to shop and laboratory work, there are many out-of-door occupations which, though not properly coming under the head of manual training, are yet of such a nature as to give valuable training in the same direction.

The experienced teacher will be able to plan such a course from these elements as shall give the proper sequence of exercises demanded by sound pedagogy and psychology. It may be elastic and individual without sacrificing its primary purpose, and to be successful it must adapt itself to the peculiar needs of the school and of the pupils. In all its work, every encouragement should be given to the exercise of those faculties which are little developed by other schools, but which are, as I have tried to make plain, so necessary to the teacher.

To realize its full value, manual training should be intimately related to all the other work of the school. It should be so woven

into the fabric of instruction as scarcely to appear as a separate subject at all. Like drawing, like the proper use of the mother-tongue, like the newer "nature study," manual training or educative handwork should pervade or attach itself to every subject where it can find a useful place. Such correlation will be the work of years; in the meantime the effort should be made to take this branch from its present, somewhat isolated position, and to bring it into a closer relation to the other subjects of the course of study.

ACADEMIC WORK AND THE SHOP—THEIR RELATION AND CORRELATION.

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Observation has lead me to believe that in most of our city schools the line of demarcation between subjects taught by different teachers is unfortunately too prominent, that as schools become more and more specialized and responsibility is divided, so the educational growth of the pupil becomes irregular, broken, bunchy, instead of affording the unifying development which makes the ideal, well-rounded mind.

Whether this condition is brought about by the exacting requirements of college examinations or by a spirit of rivalry and jealousy between teachers seeking preferment as specialists, I will not assume to say, though probably both are prominent factors. But the fact remains that in the high school with a broad curriculum and an efficient faculty, there is not sufficient intertwining and correlating between subjects.

Too much is assumed, I am forced to believe, on the reasoning faculties of the pupils. The subjects are perhaps excellently taught as subjects; the facts are imprinted temporarily at least, and perhaps a little technical logic applied. Geometry is taught from this or that text-book, each theorem is demonstrated, the axiom, corollary and conversely are stated, and in the atmosphere of the class room geometry is said to be understood. Chemistry, physics, and many other subjects of our regular high-school curriculum are similarly taught. The pupil's knowledge of the subject a year later would be an indistinct memory of a note book, a text-book, some features of the laboratory or apparatus. I am speaking of the average pupils now, not of the brightest. Experiences are single, incomplete; conclusions are mixed, uncertain, if indeed they are reached at all. Every teacher is anxious that those of his classes who are going to higher institutions of learning shall make as good a showing as possible. They are usually the brightest minds in the class and too often the work for the entire class is conformed to these brighter ones, so that the rank and file of the class is carried over the ground with perhaps a temporary understanding of the subject, but with very little practical, applicable knowledge. As

I have said, college requirements are so uncompromising in their demands, and at the same time so evasive, that when the teacher has his work so systematized that he feels he can bring a larger per cent. of his pupils to the required standard, the standard goes up, and the teacher is again forced to spend most, if not all, of the time at his command on cold facts for the benefit of the few, and the applications and experiences, which alone give power to knowledge, are perforce omitted.

That the reasoning ability of the pupil is sufficiently developed to make profitable application of his knowledge is perhaps in the main true, though not always so by any means, but that the pupil will voluntarily make use of his facts and rules and formulas, except he be led and stimulated, is certainly most unwarranted presumption. And thus it is that many—I think I may say a large part—of our pupils glean from some of their studies only a meager, superficial knowledge, with perhaps increased power to understand descriptions and processes.

It is right here, I believe, that manual training comes to the front in its strongest and truest light. It is not the function of the free public school to teach a trade or a series of trades, but rather to broaden the scope of the pupils, to develop an acuteness, an alertness, an intimate acquaintance with material things, a readiness to comprehend situations and conditions, to know what to do and how to do it, in the emergencies and crises of life. To meet such conditions, and that the hand might be able to execute in these emergencies as the mind dictates, was manual training introduced into our school system, and while it is obviously our duty as teachers to make our shop instruction conform as closely as possible to the usages and customs of good shop practice, after all it is mental development more than handicraft that the public school must keep to the front.

College requirements do not reach our departments as yet, or at least, if they do, it is only as a substitute, and the shop, as a function of our educational system, must do some of the supplementary work, the clinching, if you please, for some of the other departments. And I believe that we may profitably, from the standpoint of our pupils, which alone ought to guide us in our work, use a part of the shop time—already too short with some of us—in the application of some of the principles, rules, and formulas which the academic work introduces. It is true that time thus absorbed reduces the amount, and probably the quality, of real shop product, and the instructor who

does this must suffer from comparison, unless the conditions be fully understood. However, the difference in the comprehension and power of the pupil, as these rules and principles become real, active factors in his life, more than compensates for the difference in handicraft which the loss of time has caused. After all, the boy is our product and models are only our tools.

An accurate knowledge of both the quantity and quality of the academic work which the pupil or class has accomplished is of great importance in selecting the model in logical sequence, and of much more importance in presenting it.

In my own experience woodwork has perhaps received more time and thought than metal work. The lesson which I have chosen to introduce in this connection is not regarded as an ideal model, and much of the technical detail has been omitted, but the correlation of the shop-work with the academic work, as illustrative of what may be done with almost any models, is what I wish to make most prominent.

It is a genuine pleasure for the average boy, and one that should not be denied him, to explain voluntarily before the class, that all matter may be considered to be composed of molecules and atoms; that these molecules have definite positions and relations one to another and are retained in these positions by so-called molecular attraction; that the physical form of the mass can be changed only by the application of sufficient energy to overcome molecular attraction, and that to change this form of the mass to any desired shape, this energy must be exerted intelligently and under proper conditions. The average boy will do this reasoning if led on by logical questioning. He has made a good recitation in physics. If the facts were ever worth the learning, the little time thus spent in reasoning has been well spent, and now for an application:

An ingot of lead is taken, about seven inches long, of irregular section, in area about ¾ square inch. The mass is more or less plastic or malleable, and readily yields under the hammer, the molecules flowing in the direction of, and in proportion to, the force of the blow. This is both explained and shown in demonstration, and the pupils are required to form a piece into a retangular prism ⅞ of an inch square, upsetting. The malleability of the metal makes it possible to do very perfect work both in dimension and form and in a comparatively short time. The piece is now measured and the volume accurately determined. Lead weighs .41 pounds per cubic inch. What is its weight? How long would it be if it were ½ inch square?

How long if it were $\frac{1}{4}$ inch by $\frac{3}{4}$ inch? How long if it were $\frac{5}{16}$ inch square? If half of it were drawn to $\frac{5}{16}$ inch? Do it and prove your figures. The piece is then carefully divided as to length and marked, though not cut; it is then balanced to ratify measurement, and one half is drawn to the required form, making as square a shoulder as possible. The test of measurement is carefully applied, and while the shoulder is somewhat sloping, indicating that the end which is larger in section contains the greater mass and is therefore the heavier, balancing as near to the shoulder as possible indicates the reverse to be the case. The smaller mass is the heavier by virtue of position. A little discussion on the lever is permitted and perhaps a problem or two worked.

Coming thus suddenly upon this application of the balance beam gives added interest both to the work in hand and also to their physics, and this experience will not soon be forgotten.

When lead is first worked the surface is bright and shining, but if it be put aside for only a little time, it becomes a lusterless, dead, gray color. A little explanation of this may be in order, and the action of oxygen on other metals, though usually the class beginning in the forge room has not commenced the study of chemistry, and the chemical affinities of the different metals may be more profitably discussed when the pupils themselves are prepared to do the talking.

I am not prepared to wholly condemn the note book system of instruction in the high school, though my own experience in that line has not been entirely satisfactory. I think that, if teachers would conscientiously devote the time which they would spend in examining note books, and in preparation of lectures and material for them, to studying how, when, and where to ask questions and to lead their classes in logically reasoning from facts already learned, the results so far at least as shop-work is concerned, would be more satisfactory.

Occasionally subjects may be made of sufficient interest not only to cause the pupils to search out some facts, partially learned perhaps, from text-books already in their possession or available in the school library, but also to pursue the subjects in detail in the public library. Whether the particular point of research be of much or little real value in itself, the pupil has through it placed himself in a most wholesome attitude of study and inquiry, and the teacher has found his pupil.

I believe, however, that this kind of work can be successful only when teacher and pupils are in full sympathy and accord, and, unless

the teacher finds a keen, responsive interest in his class, pressing a voluntary discussion becomes the flattest kind of failure.

I will leave this lesson in lead with the mere statement that we make the stereotyped hasp of it. The details are familiar and would be wearisome. I am aware that I have displayed more courage than judgment in presenting it at all, for the use of lead in the forge room was severely criticised at the last meeting of this association in Providence. But, considering the place at which it is introduced, the time consumed upon the lesson, and the results obtained, I am still unwilling to discard it.

The difficulties of pencil and paper work in the average forge room are more or less serious, and it is often desirable to hold the class for a few minutes in one of the other rooms, where the class may be seated and take a part of the discussion before going to the forge room, or perhaps for the instructor to perform the operations upon the board at the dictation of the class.

It would be impractical and in extremely poor taste for me to set forth a series of models in detail before this association, and without reference to accompanying models; I will briefly mention some of the subjects which I think might profitably be appended to our courses in metal work. These, I am sure, we should find closely enough related to some of our models to give them added interest and to furnish reflective material for the hours of work which nearly every lesson demands, as well as to touch some boy in some particular point in his individual make-up, so as to enable the instructor to get nearer to him and bring out some individual and personal attributes.

Iron — most common commercial ores? Where found, how mined and smelted? Why is limestone used in smelting? What is pig iron? Wrought iron? How made? Common impurities? Norway iron compared with American product. Manufacture of steel, processes. Approximate weight of iron per cubic inch. Estimates on weights of bars and castings. Determine area of sections by the use of coördinate lines, and estimate weight of I-beams and rails. Other metals. Common impurities of coal.

Speeding machines from main shaft. Working out sizes for countershaft pulleys. Transmission of power by belt, by gears, by rope. Losses in power transmission, how caused? Slipping of belts, how caused, how prevented? Tightness of belts; lacing of belts. Friction — causes; how prevented? co-efficient of friction. Lubricants;

vegetable, animal, and mineral oils. Spontaneous combustion — conditions favoring and otherwise.

These and many more topics of a similar character, particularly lessons and problems involving some mathematical formulas, may be given, not for their mechanical value alone, but to present to the pupils, while they are yet in touch with the subject, some practical applications of algebraic formulas and calculations and the treatment of equations.

It might not be practical, indeed it might not be possible, to touch upon all of these subjects in some schools and in some courses. But, according to the equipment, according to the model, and according to the preparation and experiences of the instructor, either as technical or general information, some of these topics, or such as these, may be taken up in the class, carefully studied from the standpoint of the academic progress of the class, and developed as much — perhaps more — by questioning than by lecture, thus calling into use some of their science and mathematics, and leading into new avenues of thought.

These theories I have long cherished and made of them what I believe to be profitable use, especially in woodwork, but last year, as the result of an over-crowded physical laboratory, it fell to my lot to teach a class in advanced physics so-called, in our manual-training rooms. For a full year the class worked on problems in mechanics and electricity with little other apparatus than our motor with volt and ammeter, and our regular woodworking and machine equipment ; and the possibilities and importance of correlating the shop with the academic studies grew on me as never before.

We in Lynn, have not as yet definitely systematized our models, and the various lessons for which they may furnish the basis, and in doing this some of our present models will doubtless be changed to bring about better sequence. But it is a settled conviction with me that in our public schools, where the educational value of the work is, and ought to be, paramount, much is possible in the way of correlation that is not generally being realized.

CONSTRUCTIVE DESIGN IN WOODWORK. II.

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New York.

In a former article under the above caption some examples of table construction were considered in illustration of principles in designing. By way of further illustration it is proposed now to offer some brief suggestions as to the construction of chairs.

A chair is "a movable seat for a single person with a frame to support the back." Such a structure is the type, Fig. 1. Its construction needs little explanation, all parts being framed together with mortise and tenon joints, except the seat, which is fastened with screws from below. Ancient sculptures and drawings show that chairs of similar construction were used in very early times, and examples of like design may be seen in our leading furniture warerooms today. For most purposes, however, this form is considerably modified. The back is usually inclined several degrees from the perpendicular, which necessitates a curve in the uprights forming back and legs. Curves are also introduced in the contour of the back and seat, while the curving of the back rails may at once render the design more beautiful and the chair more comfortable. If the lower rails are to be omitted, the upper ones should be made somewhat broader, and the legs tapered as in the table. But while details of design vary greatly, according to the taste of the designer and the special purpose for which the chair is intended, the same principles of construction generally obtain.

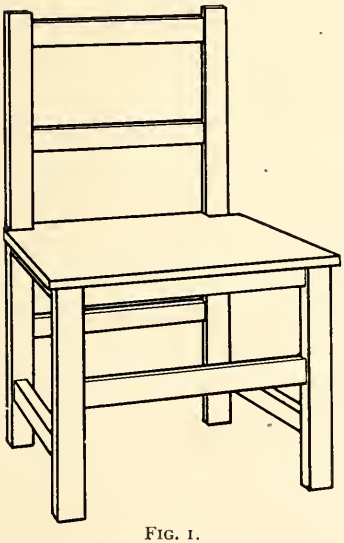


Fig. 1.

The simplest form of armchair, and structurally the best, is made by increasing the height of the front legs about eight inches above the

seat and adding pieces to form the arms, though this is but one of a variety of forms in common use.

Of upholstered chairs there are many varieties, the more luxurious kind showing no woodwork except the legs. In these the back and arms are usually of iron. Those which show the framework to which the upholstering is attached should be joined in substantially the same manner as the type, Fig. 1.

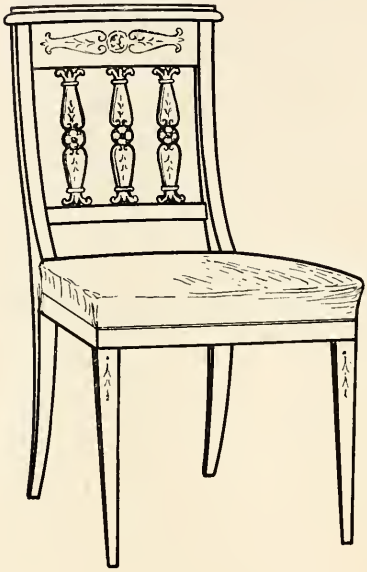


FIG. 2.

A good example of sound construction combined with graceful design is shown in Fig. 2. This is a chair of the empire style — a reaction from the extravagance and insincerity of the Louis XV. period. The curves of the back uprights are not without excuse and do not materially weaken the construction; the front legs are straight, and the rails of the seat are broad enough to afford the necessary strength. In the back the uprights are held together by cross-rails firmly mortised in with sufficient bearing surface at the shoulders, each piece having the grain continuous from end to end. No attempt is made to conceal joints, which are indeed more frankly shown than those of any ordinary piece of panel-work. In short, all the essential features of the type are preserved. The ornamentation of this chair is of inlaid work.

The back of a chair, when not upholstered, affords opportunity for great diversity of detail in design — diversity enough, one would think, without departing from sound constructive principles; yet here, perhaps more than anywhere else in the line of furniture design, we find the laws of wood construction ignored. Chippendale and his contemporaries have left us numerous examples of chair-backs of elaborate design, most of

FIG. 6.

them of pleasing effect when regarded as mere combinations of lines, but few of them tolerable as specimens of woodwork or comfortable as supports for the back. The designers seem to have lost sight entirely of the principle that ornament should be subservient to construction. Examples of such backs are given in Figs. 3, 4, and 5. Fig. 3 is by Chippendale, and the others by English and French designers of about the same period. Comparing these with Fig. 2, their weakness and untruthfulness will be evident. The thought in the designer's mind was not primarily to frame the chair-back together in a workmanlike manner, but rather to make it a vehicle for a pretty arrangement of lines, a bit of rococo carving, or "the tricky manipulation of a ribbon." To this end the wood is cut in a manner entirely unsuited to its nature, and joints are concealed.

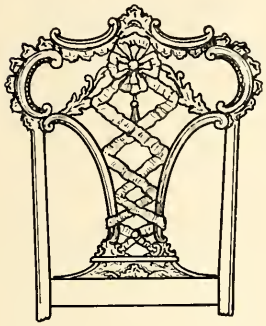


Fig. 3.

The cabriole leg (of which Fig. 6 is a specimen), so frequently used in combination with these backs, is, of course, open to the same criticism.

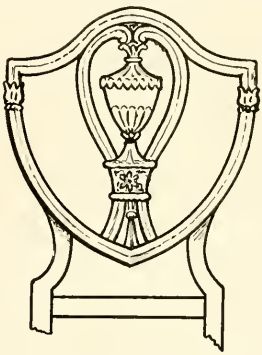


Fig. 4.

A type of chair in which the method of construction is fundamentally different from that of Fig. 1 is shown in Fig. 7. This may be regarded as a four-legged stool with a back attached, and suggests the evolution of the chair. This form of construction is obviously adapted only to chairs with solid wooden seats, both back-posts and legs being tenoned and driven into holes in the seat. It has the merit of being honest, but lacks the strength of the other type. While chairs of the commonest kind are made in this way because of its cheapness, the same principle of construction is found in others more or less costly,

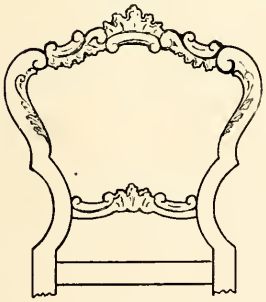


Fig. 5.

made in various countries and at different periods. A specimen of this type is shown in Fig. 8. The seat of such a chair should be not less than one and a half inches thick, and made of strong material, the grain running from front to back. A cleat tightly fitted in a dovetailed groove across the grain makes the work more permanent. The back should be fitted to the seat with a double tenon, keyed below, and care must be taken to allow sufficient material — say one inch or more — between the mortise and the edge of the seat. The legs should be spread outward at an angle sufficient to give the chair a firm bearing on the floor.

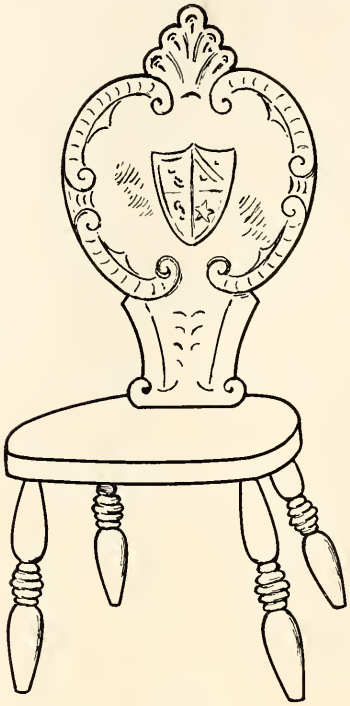


FIG. 8.

This chair may be regarded as a piece of furniture rather than a seat — a sort of conventional chair, more to be seen than sat upon — for the "frame to support the back" is certainly not well adapted for that purpose. Whether the chair should therefore be condemned as bad art it is not the purpose of this treatise to inquire, but I will venture to point out that there are numerous examples of chairs no less conventional than this of which the right to exist is unquestioned, such, for instance, as are used in churches and other places where public functions are held. But these, of course, must not be placed in contact with inharmonious surroundings. A chair of Gothic design and massive proportions would be as obvious an absurdity in a private parlor as would an invertebrate easy chair in Westminster Abbey. So the reception chair of antique design may have its place, even though it is stiff and uncomfortable.

Many of the ecclesiastical chairs referred to are constructed on a principle essentially different from either of those already described, the sides being formed of solid planks grooved to receive the seat

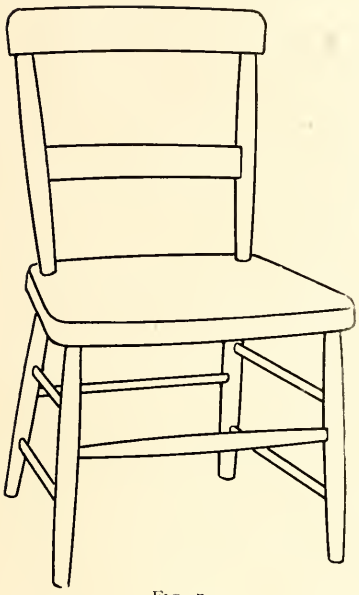


Fig. 7.

in their construction. This is because the wood is no longer a rigid straight-grained material. Angular forms, straight members, and mortise-and-tenon joints give place to curved outlines, splices, and lapped joints secured with screws. These chairs are constructed on sound principles, are usually graceful and pleasing in form, and are much stronger in proportion to weight than a framed chair can possibly be made.

A practical knowledge of sound constructive principles should enable the designer to

and cut into some suitable shape for the arms. The cross-bar connecting these sides at the top is frequently surmounted by a pediment, and the back filled in with panels appropriately ornamented. The space below the seat is sometimes filled in, and the bottom surrounded by a plinth.

Another form of construction frequently met with in mediæval furniture is that shown in Fig. 9. This must be heavily framed to be strong enough for use, and is, of course, an extremely bad design for wood.

Chairs of bent wood have come into such general use in these days that it seems proper to mention them here. It will be readily seen that the established methods of wood joinery find little application

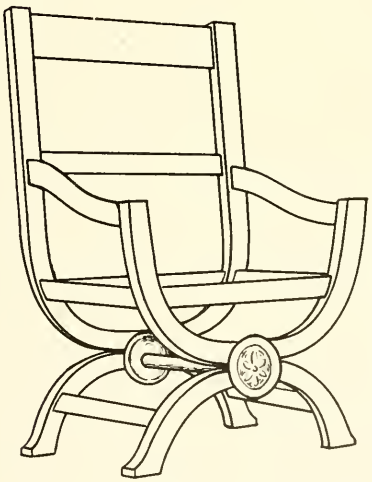
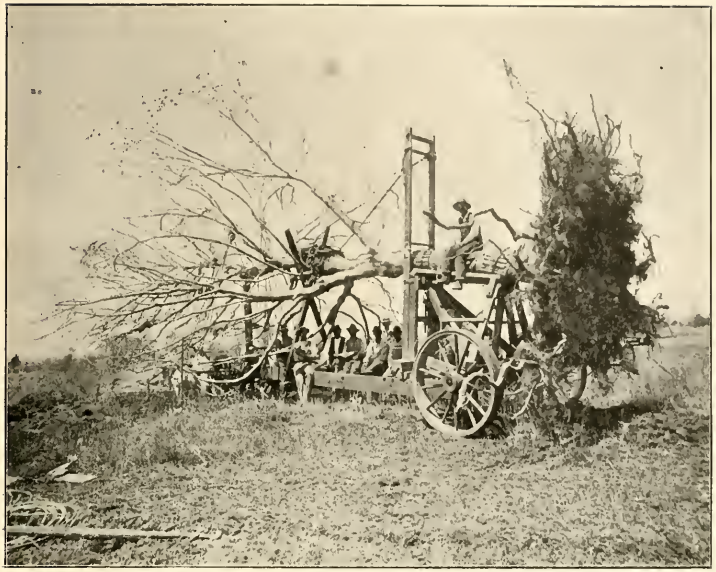


Fig. 9.

discriminate between the true and the false, the substantial and the flimsy, the dignified and the vulgar. The possibilities of originality and beauty of form are boundless without resorting to extravagant and unnecessary curves or concealing joints. Let him who would design a chair, therefore, work with the right end in view — to construct in an honest and substantial manner, and as beautifully as may be, "a seat for a single person with a frame to support the back," adapted in form and finish to the particular purpose for which it is intended, and not a mere form of abstract prettiness, or something to be carved, which may be called a chair for want of a better name.



LEAF-FORMS OF OUR COMMON BROAD-LEAVED TREES.

II.

EDWIN W. FOSTER,
Manual Training High School, Brooklyn, N. Y.

THE peculiarities of trees which make them friends or strangers to boys are generally those of utility from the child standpoint. For instance, horse-chestnut, butternut, and hickory are more apt to be familiar names to the boy than elm, tulip, or white pine, for reasons too obvious to require mention. And again the horse-chestnut will be known to the youth owing to the nuts it produces rather than by the pyramidal clusters of its flowers. He is more interested in the fact that buckeye is used for plow-handles or other farming implements than in descriptions of the grace and beauty of the elm. In other words, the healthy human boy of twelve or fourteen is more interested in the utilitarian than the æsthetic side of trees, as well as of many other subjects. It is well to keep this keynote in mind in our talks on trees.

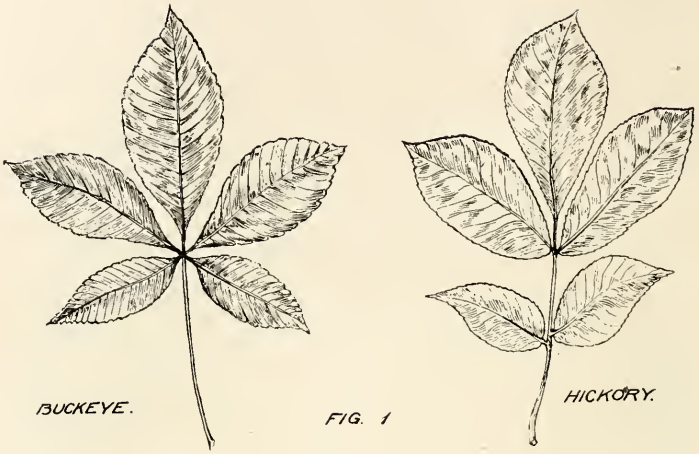


FIG. 1

He will be interested to know that, although a popular shade-tree which flourishes on American soil, the horse-chestnut is not a native, but was imported from Europe.

This is a good time to introduce the subject of compound leaves, the horse-chestnut leaf being an excellent example. It also leads up naturally to the hickory, black walnut, butternut, and buckeye, all of which have compound leaves composed of a number of leaflets, and all with distinct characteristics. The hickory needs but to be touched upon to bring up such names as shagbark, shellbark, and pignut.

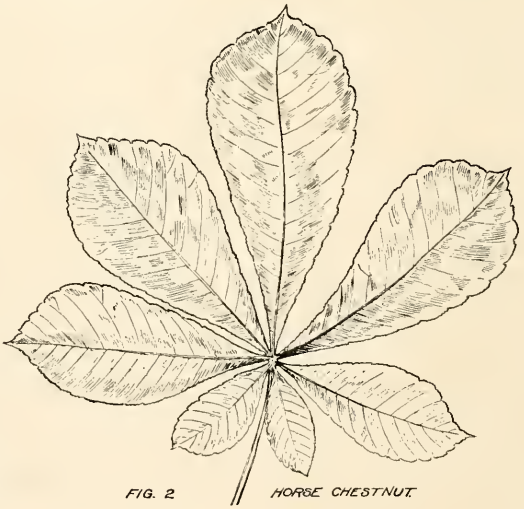


FIG. 2 HORSE CHESTNUT.

This is also a good time to explain the difference between strength and

toughness, oak being a good example of the former and hickory of the latter. The difficulty of working which precludes this strong and tough wood from being used in building operations does not prevent its extensive use in the making of farming implements and in carriage work.

FIG. 3. BLACK WALNUT.

The leaf of the hickory may easily be distinguished from the buckeye, which it somewhat resembles, by the fact that the leaflets of the former are arranged on opposite sides of a central stalk, while in the buckeye they radiate, as in the horse-chestnut, from one central point.

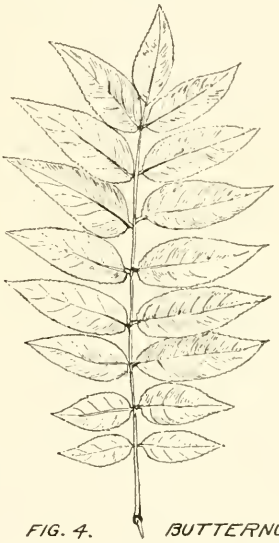
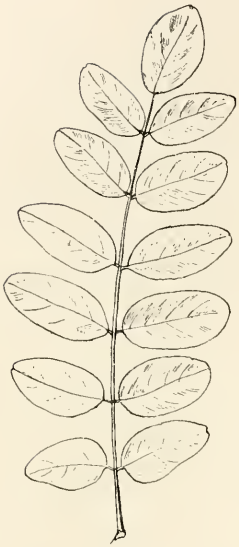


FIG. 4. BUTTERNUT.

Perhaps no two trees are so difficult for the city-bred boy to distinguish as the butternut and black walnut. Both have compound leaves, the number of leaflets, according to Schuyler Mathew, varying from nine to seventeen for the butternut and from fifteen to twenty-three for the black walnut. A leaf having fifteen leaflets, then, might belong to either tree, were there no other distinguishing features. The teeth on the black walnut leaflet are larger and sharper than on the butternut and lack the fuzzy stem; yet even the nuts, when partly grown, will deceive the novice; although the black walnuts, which are about the size and shape of green lemons, are more rounded than the butternuts. The unmistakable feature, however, is the odor. Having once smelled the crushed leaves of a butternut and of a black walnut, a person will thereafter need no other test.



LOCUST.

HONEY LOCUST.

FIG. 5.

The use of black-walnut lumber in cabinet work is well known. Some of us can still remember the breezy stories of our western cousins of whole cities paved with black walnut. These stories were true, many of them, as the central West was liberally supplied with fine black-walnut timber at the period when cities like Des Moines, Ia., were laid out. The streets were, indeed, paved with black-walnut blocks stood on end. The stories, however, were related at a later period when black-walnut furniture was the furniture of fashion. This period, too, has passed away with the supply of black walnut. Enough remains, however, to supply us with gun-stocks, for which purpose nothing seems better suited.

FIG. 6. YELLOW WOOD.

Butternut is a lighter wood, but takes a good polish and is used to a limited extent in cabinet work; perhaps this might be more extensive but for the

fact that the tree does not furnish either the long or wide planks for which the larger and more luxuriant black walnut is noted.

The subject of compound leaves should not be passed by without considering the locusts. The ordinary yellow or black locust presents as great a contrast between the character of its foliage and bark as can be imagined, the former being noted for its delicacy, the beautiful light pea-green of its leaves, and the creamy white of its fragrant flowers, while the trunk is covered with the roughest of bark studded with prickles. The tree is not a thing of beauty when stripped of its foliage, but its timber is very valuable for exposed members, particularly those in contact with soil, its durability taking first rank.

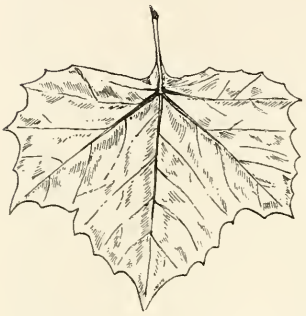
HICKORY IN WINTER

The clammy locust is a close relative of the yellow variety, with quite similar leaves, but in most sections rarely grows large enough to be called a tree. It may be distinguished by the sticky gum which covers the branchlets, and by the flowers which are pink or pale rose in color. It is often cultivated for these beautiful blossoms as a lawn shrub.

The honey-locust, another member of the pea family, has been characterized by Harriet L. Keeler as a tree whose foliage is that of

the common locust etherealized, and it might be added that the prickles of the latter have been magnified into murderous thorns in the former. Surely few stronger contrasts in foliage can be found than when the fern-like beauty of the honey-locust is found in proximity with such leaves as the American basswood, catalpa, or tulip.

FIG. 7 BUTTONWOOD.



Yellow-wood is a variety of this family, but is rarely met with in the northern states, except where planted by the landscape gardener in our public parks or private lawns. The leaf consists of an odd number of leaflets, from seven to eleven, the odd one being at the extremity of the stem, its expanded balloon-shape being a distinguishing feature. Its wood, which is heavy, hard, close-grained, and strong, is not very well known on account of the comparatively small size of the tree, but it is a beautiful, clean-cut, and valuable tree for the lawn.

No list of trees would be complete which did not include those three forest giants, buttonball, tulip, and sweet gum. The various names — buttonwood, buttonball, sycamore, and plane tree, as it is called in different localities — all suggest that fine American tree which sheds its bark as well as its leaves, leaving a ghostly and gaunt monarch of tree life which produces an enormous crop of "buttonballs" so well known to country boys. The leaves are on a scale with the size of the tree, often measuring a foot in length, and being frequently covered on the under side with a heavy fungus growth. The wood of the sycamore, as it is erroneously called, is valuable for cabinet work, having a beautiful grain and taking a high polish.

The sweet-gum tree also produces a crop of "balls" or seed-pods, but, although about the same size as the buttonballs, they need never be confused, as the gum-balls are covered with somewhat sharp points, while the button-balls are comparatively smooth.

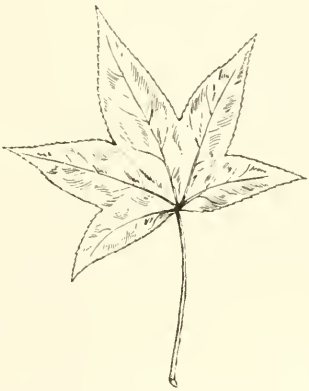
The leaves of the sweet gum, or "liquid amber" — so called from the amber-colored gum the tree gives out — remind one of the star fish, being five-fingered and decidedly different from any leaf in the forest. The tree grows to a height of a hundred and fifty feet, and its wood is a handsome brown color with fine and intricate markings. It

warps excessively, but is valued for wood-turning on account of its softness and uniform grain.

The lumber furnished by the tulip tree, commonly known as "whitewood," is less liable to warp than gum-wood and is somewhat harder. Just why it should be called "whitewood" is not clear, as it is much darker than white pine and of a greenish-yellow color. The leaf of the

TULIP or WHITEWOOD.

FIG. 8



SWEET GUM or LIQUIDAMBER.

tulip tree is remarkable for its individuality. It is distinctly four-pointed, without any small indentations or teeth, and with a clean-cut outline so odd that one often wonders if nature did not use a pair of scissors in cutting it out. Each leaf stands out aggressively on a long stem, and there is none of the drooping or clustering tendency often seen on trees like the elm or maple. The glory of this tree — which gives it its name — is the mass of tulip-shaped flowers it bears in the spring. These are yellowish-green in color and develop a narrow light-brown cone which remains on the tree throughout the winter. The tree reaches its greatest development from the Ohio valley south, where it is frequently found from five to seven feet in diameter. The Indians formerly made their dugout canoes from its trunk, and in some sections it is still called canoe-wood.

ASSOCIATIONS.

THE EASTERN MANUAL TRAINING ASSOCIATION.

THE seventh annual meeting of the Eastern Manual Training Association was held at the Central High School, Cleveland, O., June 28, 1900.

The session was opened by the president, Mr. R. Charles Bates, who, after briefly expressing his pleasure in seeing the members of the association again assembled for the furtherance of their work, introduced Mr. H. C. Muckley, of the Board of Supervisors, Cleveland.

ADDRESS OF WELCOME.

Mr. Muckley extended a hearty welcome to the association on behalf of the public schools of Cleveland. As a supervisor the speaker was interested in the development of the whole child, and he believed that manual training was a most important factor in such development. Various conceptions had been entertained as to what constituted a complete education. Once the man who had studied languages and logic felt that he had no need to know much of the great world. Science was added later, and now we had come to realize the value of training the hand. Manual training reaches more than the mere muscles. When once the hand is taught, we have enlarged that mysterious something which moves the hand — the mind. Complete education is not a narrow thing. Power to do special work comes from having a broad foundation. First the man, or woman, then the special work. The public schools take special pleasure in welcoming this body of teachers, because in manual training we believe we have one of the mightiest allies.

The next speaker introduced was Mr. J. Liberty Tadd, of the Public Art School, Philadelphia, whose subject was

ART, MANUAL TRAINING, AND NATURE STUDY IN EDUCATION.

In opening his address Mr. Tadd laid much emphasis on the importance of training the hand in the early years of life. Education concerns not only the mental powers, but also the physical and the spiritual. Through the hand we energize the brain. The child is possessed of superabundant energy, which should be stored up to be discharged in later life. Children should be trained to (1) accurate observation, (2) keen perception, (3) sound reasoning, and (4) energetic action. The tendency of our public schools is to make our children indisposed to action. We give them too much abstract work.

The nascent periods of a child's life are, first, the play period; then, the period of free movement of the limbs; third, the period of accurate movement; and fourth, the emotional period. Most school work fails to take these periods into consideration. The speaker here dwelt with much earnestness on the importance of giving the child the chance to realize the potentialities of his being. Nothing is of more importance to the young than the possession of those powers which may be developed by right training.

Mr. Tadd explained that the system now followed in the Public Art School of Philadelphia was the result of twenty years' experience. During this time he had

found the fallacy of ordinary carpentry for young children, and had settled on a system which is now in operation in seven private schools, seven night schools, and one Catholic school in Philadelphia, besides many schools in other places. In this system facility of hand was regarded as fundamental. Children acquired the power to make things stand erect, to make things balance, and to grasp size. In these exercises the movements were repeated until they became automatic. The speaker illustrated the elementary exercises by drawing circles on the blackboard with a quick, free movement, going over the circle several times continuously. This was done in both directions, first with the right hand, then with the left, and then with both together. Then followed an exercise in straight lines, vertical, horizontal, and oblique; then the drawing of loops in all directions. "Facility, not accuracy," was the motto at this stage of the work. Children repeated these free movements until they gained perfect dexterity, the lessons never occupying more than five minutes. Examples of original work were shown consisting of decorative designs formed by the combination of reversed curves, etc. In drawing from nature the same principle obtained — facility first, then accuracy. Work in delineation in the Public Art School was given in three mediums: on a flat surface, in soft clay, and in tough wood. The facts and forces of nature should be taught. The daisy, for instance, was bristling with facts, and children should be able to name them. Mr. Tadd severely condemned the fine work sometimes given to children in the kindergarten, characterizing it as dangerous and wicked. The larger movements should be taught first, giving free play to the child's natural energy and not suppressing it.

This address was illustrated by a series of very interesting stereopticon views, showing classes at work in schools where Mr. Tadd's system was in operation.

The discussion was opened by Mr. Louis Rohrheimer, of the Cleveland Art School, who advocated allowing pupils to copy the old masters. He would also allow them sometimes to draw from a sketch book as well as from nature. We should not allow a child to be satisfied with his own forms, good or bad. Many poor forms were to be seen in our manual-training exhibits. Our schools needed more nature study, more free-hand drawing, and more good models.

Mr. Upton questioned the wisdom of cultivating automatic movement in manual training. As soon as a process becomes automatic it loses its chief value. Every action should be attended by self-control and inhibition. He had a great respect for the cube. It is as good for a boy to know how to make a box as how to decorate it. The influence of the water-wheel, the steam engine, etc., is as educational as that of nature.

Mr. Tadd held that, while the control of the muscles was automatic, the attention of the pupil would be concentrated on the work in hand. There was no lack of exercise for the faculties. The dentist knows the value of automatic action, which enables him to put his whole thought on his work. Mechanical work should be introduced, and is introduced in the Public Art School, in its proper place; but art work is most important in the elementary stage.

INDUSTRIAL EDUCATION AT THE TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE.

Mr. Arthur V. Craig's paper on this subject, read at the afternoon session, was chiefly descriptive of the work carried on in that institution. The average attendance of students at Tuskegee is 1,000. Lack of funds is the most serious hindrance to the work. The practical character of the work of the industrial classes is indicated by

the fact that of the forty-five buildings now in use the work on all but three was done by students. There are twenty-one divisions in the industrial department, representing the most important trades. The twofold value of manual training is recognized—its value as a factor in education and also as a preparation for work in the industrial department. Mr. Craig spoke enthusiastically of Mr. Washington's great work at Tuskegee, which was rapidly developing among the negroes a spirit of order, industry, and thrift, and an aspiration to help the race.

THE VALUE OF THE SLOYD IDEA AS A BASIS FOR EDUCATIONAL MANUAL TRAINING

was the title of a paper read by Mr. I. M. Carley, of the Chicago Normal School. Mr. Carley pointed out the importance of training the motor activities of the child during the nascent period, from the fourth to the fifteenth year. The fundamental movements should be trained first, then the finer muscles. The sloyd system seemed best calculated to meet the requirements of this early training. Among the benefits claimed for this system were the following: cultivation of a right motive; power of concentration; power of inhibition; precise and definite thinking; development of touch; development of the æsthetic sense; accuracy; respect for work; right habits of working; organic skill. The repetition of an exercise till it becomes automatic, the speaker believed, should be strictly guarded against. Fixed courses of work do not take into consideration the differences of individuals. No course can be devised every piece of which appeals to every child. One defect of much of our manual training is that there is not enough originality demanded, and the child is not given sufficient opportunity to develop his latent powers.

Professor C. R. Richards, of Columbia University, in discussing this paper, said that the element of self-expression seemed to be coming to the front more and more as the keynote of manual training. It appeared to be a third stage in the evolution of the manual-training movement. First, we had the idea of pure manipulation, then purposeful achievement, and now self-expression. Before the child is capable of the creation of the whole, including inception, planning of methods, and execution, his powers of expression may be drawn out by allowing him some freedom in the selection of models, in modifying designs, and in decoration.

A THEORY OF MANUAL TRAINING AND ITS APPLICATION IN CARD-BOARD INSTRUCTION.

Mr. J. H. Trybom, director of manual training, Detroit, said that his theory of manual training, as presented in this paper, was based on the universal law of habit. With every mental change there is a change in nerve tissues. Any sequence of mental conditions tends to perpetuate itself. It is not the aim of manual training to give the child some specific power, but to develop in him useful habits of a general nature, as, for example, the habit of logical procedure, of order and neatness, of manual activity, the ethical habit, the habit of accuracy and of self-reliance. A pupil should never be asked to do what he cannot do well. Continued failure will have an injurious effect, while every success will add to the power of succeeding. We must emphasize accuracy in manual training and teach the child that only right is right.

Mr. Bryant agreed with Mr. Trybom as to the results of failure. An old argument in favor of the Russian system was that if the pupil failed he did not spoil a whole model which might involve several joints. Failures might be prevented by a judicious arrangement of the course.

Mr. Trybom held that much depended on the interest of the pupil. Interest depends on power, and power is more evident to the pupil if he is making something which he can use. In reply to a question Mr. Trybom said he considered children capable of using the rule with sufficient accuracy from the fourth year onward.

Mr. Vroom observed that two distinct phases of manual training, the artistic and the mechanical, had been very ably presented by their respective advocates, and he saw no real conflict between the two, provided we could agree as to when the latter should be begun. Mechanical manipulation and geometrical precision were indispensable elements in a well-balanced scheme of instruction, but the tendency had been to introduce mechanical work too early. Mr. Trybom would introduce it in the fourth year, while Mr. Tadd would put it off for some years longer and then give it but a small place on the program. It seems to be agreed that free-hand work should come first; the practical question is, Where shall mechanical work be introduced, and what ratio shall be maintained between the two through the succeeding grades?

Professor Richards thought it a mistake to be too much concerned as to where this or that kind of work should come in. Children in the primary grades had worked with saws, hammers, etc., making boats, sails, houses, and fences. Manual training belonged to the expressive side of school life, and the child should be allowed to give expression to his ideas by such means when conditions rendered it practicable.

The proceedings of the second day were opened by the president, who read a letter from Mr. Gustaf Larsson, member of the executive committee, expressing his regret at being unable to attend the meeting of the association and his continued interest in their work. The president then introduced Mr. Daniel Upton, director of manual training, Buffalo, whose subject was

SOME OBSERVATIONS ON GRAMMAR-SCHOOL COURSES IN MANUAL TRAINING.

It was the purpose of Mr. Upton's paper to suggest a line of work wherein the subject-matter should arise from the experiences of the child's life. This would be called the correlative system, to distinguish it from that in general use, which he would call the model system, in which every pupil worked out the same series of models.

"Observation, reflection or deduction, and expression must be the chain of mental operations in order to make knowledge dynamic, and it would seem that the fullest benefits from manual training would be obtained through a course which would afford the child a natural avenue for the expression of ideas occurring in any of his fields of observation." The child who only expresses what others think out and present to him is not being fitted for leadership, or even for independence. Acquisition of skill will be proportional to the child's interest in the end to which the operation is a means. With reference to the sequence of tools, the speaker believed a tool should be introduced, because in the child's life there is a living need of that particular tool, and not because he has used some other tool just before it or will use some other just after. The instructor should lead the designs into such forms as to make them include only such operations as the child is physically capable of performing.

The model system has many advantages, as being easy of application in large classes, securing uniformity of class work, etc., but careful work done under both leads to the conclusion that the correlative system yields better results in the development

of the pupil. Correlation between drawing and manual training is of the highest importance. The grade teacher and the manual-training instructor should work together and bring the work of all departments into as close relation as possible. As an aid to correlation, workshops should be equipped with tools for working clay, glass, wire, tin, and leather, besides the wood-working tools. To summarize the conditions which should exist to make the correlative scheme a success, we should have: (1) a school curriculum wherein the arts, constructive and decorative, and science, are accorded a part; (2) schemes of correlation or concentration carried out in all the school work, particularly in processes of expression; (3) teachers of manual training who are thoroughly conversant with the regular grade work and who are experts in teaching and in wood-work, and versatile in other handicrafts; (4) grade teachers who understand designing, both constructive and ornamental.

The fact that under the scheme here outlined the speaker had seen creative instinct grow strong, inventiveness become active, and the power to go ahead and do things become a characteristic of the child, had convinced him that there were in such a system particularly beneficial elements which should commend it to the attention of thoughtful students of manual training.

Commenting on Mr. Upton's paper, Mr. Bending called attention to what appeared to him a tendency to indorse the principles of Mr. Tadd's system. Both had laid much stress upon the value of original work on the part of the pupil.

Mr. Trybom was of opinion that the two theories were entirely opposite. Mr. Tadd would make the exercise automatic and then use it as a means of expression, while Mr. Upton would have the boy work out his own ideas, but stop as soon as the operation became automatic.

Mr. Entwistle feared that the idea of originality was being carried too far. A child who was familiar with historic forms and principles of design could not originate things satisfactorily. Classic art should not be ignored. We should teach principles and follow well-tried methods.

Professor Richards adhered to the view that the aim of manual training was to develop power of expression, not to develop skill. Self-expression, therefore, should be the dominant note. The basis of Mr. Tadd's theory was automatic control. In construction automatic facility is inconceivable. If you could work it out, it would not be manual training.

The president here announced that the executive committee had decided to bring the meeting to a close at this session, if possible.

Mr. A. B. Entwistle, of the Central Manual Training School, Philadelphia, was then introduced as the next speaker, the subject of his address being

THE SENSE OF TOUCH IN MANUAL TRAINING.

By a clear and careful comparison, Mr. Entwistle demonstrated the paramount importance of the sense of touch. In learning to ride a bicycle, learning to swim, and, in fact, in most of the operations of our everyday life, we are guided by feeling, rather than by sight. This points to the importance of training in those lines in which the sense of touch is involved. The mechanical operations of the manual-training school, drawing lines, gauging, sawing, planing, chiseling, etc., are peculiarly adapted to the development of this important sense. The attention of students should be directed to the fact that in mechanical work their movements are regulated largely by touch.

At the conclusion of Mr. Entwistle's paper several speakers indorsed the soundness of the views expressed, one giving an instance of a little girl who, having difficulty in learning to gather, had been helped by practising without looking at the work.

SEWING AS RELATED TO MANUAL TRAINING.

Mrs. Ida Hood Clark, of the Manual Training High School, Brooklyn, speaking on this subject, strongly defended the right of sewing to a place in the school curriculum as a branch of manual training. A brief sketch of the history of domestic art in education was given. Switzerland leads the world in the number and excellence of the schools in which this branch is taught, and much attention is given to the subject in France. Italy has established schools for lace-making, and the same industry is being cultivated by Mrs. Bell, in Nova Scotia. In this country all that has been done is of very recent growth. The tendency has been to treat sewing from the useful and practical side only, but its value as an educational factor is now becoming more fully recognized. Children must be led to think, not only of *how* to sew, but of *what* to sew. The sewing teacher has a fine opportunity of developing the tastes of the pupils in regard to personal and household adornment, for cultivating a feeling for form and color, and arousing and developing a truly artistic appreciation of that which is suitable and harmonious. In the grades the work should be so arranged as to give practice in the more important varieties of hand-sewing, until a reasonable degree of proficiency has been obtained. In the high school dressmaking and millinery are taken up.

Sewing as manual training gives the girls increased dexterity and greater keenness of observation, a greater development of the nerve centers in the brain, and the consequent increase in general intellectual power. Sewing is of great value in the formation of character. It is impossible to hide the results of error or carelessness, and the girls learn to despise sham and respect honest work. Pupils will also learn to appreciate the injustice often done to those employed in making the ready-made garments sold in our stores. The sewing teacher has opportunities peculiar to her department, of getting in touch with her pupils and fitting them for the many duties of that most important phase of life — the making of the home.

This interesting paper was followed by a general discussion, in which some differences of opinion were expressed as to the time which sewing should be allowed to occupy in the school. One speaker pointed out the danger of girls losing their share in general manual training through the intruduction of too much sewing. Work involving such fine muscular adjustment should not be given to children from five to eight years of age. Others hold that sewing should be taught in the early grades, because of its value both as an educational agency and a practical acquirement.

Dr. Charles R. Henderson, of the University of Chicago, being unable to attend the meeting, his paper on "Social Progress" (printed in full elsewhere in this issue) was read by the president. The concluding paper was that of Professor Walter W. Davis, of Iowa College, on

THE DEVELOPMENT OF MUSCULAR POWER.

This paper dealt with the development of muscular and nervous energy as indicated by a series of scientific experiments carried on by the writer. Motor ability was studied in three phases: (1) rapidity, (2) strength, and (3) accuracy of voluntary effort.

(1) A gain in rapidity of movement resulting from exercise of the right great toe accrued in all toes and fingers. This gain must be referred to a common cause — the central nervous system. (2) Experiments made for the purpose of determining the gain in strength and girth measurement of the biceps from the practice of raising a dumbell with the right arm showed the following results: (*a*) a large gain in ability to raise in arm not exercised; (*b*) increase of girth in arm not exercised; (*c*) no correspondence between girth gains and flexion gains; (*d*) there seemed to be less blood in unused arm; (*e*) increase in dynamometric power, almost as much in left arm as in right. (3) In a test of the accuracy of voluntary effort the increase was found to be 36 per cent. in the unpracticed arm. Experiments show the great importance of attention in acts of volition. Fatigue is chiefly central. In learning an action that involves fine coördination it is obvious that the pupil executes many movements that are entirely unnecessary. The nervous impulse has flowed out into wrong channels. Cross education is judged (from carefully arranged experiments made by the writer and others) to be due chiefly to the influence of the higher mental faculties. Certain conditions indicate the presence of another factor — the physiological factor. Strong will-power and attention seem to be a hindrance to rapidity of tapping, rather than a help. Knack is not a sufficient explanation for certain great gains in grip, which seem to be due rather to the physiological development of motor nerve centers.

Professor Davis concludes that: (1) The effects of practice may be transferred, to a greater or less degree, from the parts practiced to other parts of the body. This transference may result in an increase of muscular tissue in the unpracticed part, or only give it greater effectiveness. (2) The factors most prominent in the transference of muscular power, skill, or endurance are, (*a*) will-power and attention; (*b*) knack (or coördination of mind and muscle); (*c*) the physiological factor. "What should be specially emphasized now is that the central effects of manual training are the important effects; that these central effects involve some of the higher mental faculties, such as will-power and attention, coördination, discrimination and choice; and that these faculties, when developed for any particular act, are effective for all acts."

BUSINESS MEETING.

The president announced that the committee appointed at the last meeting of the association to revise the bibliography of manual training had completed its work, and that copies of the new bibliography would be distributed without charge to all members of the association who had paid their dues.

Mr. Upton conveyed to the association an invitation from the superintendent of education of Buffalo to hold the next annual meeting in that city. The invitation was unanimously accepted by vote of the meeting.

A letter of resignation from Mr. Walter J. Kenyon, secretary of the association, was read by Mr. Irons, acting secretary. Mr. Kenyon's resignation was rendered necessary by his removal to a new field of labor in the West.

After the reading of the treasurer's statement, which showed a substantial balance on hand, the meeting proceeded to the election of officers for the ensuing year, the result being as follows: president, William E. Roberts; vice-president, Frank H. Ball; secretary and treasurer, Foster H. Irons; members of Executive Committee — Daniel Upton, Charles R. Richards, R. Charles Bates.

With reference to the exhibit of work, little more need be said than that it bore favorable comparison, both in extent and quality, with those of previous years. Exhibits are to be seen, not described. That this one was fully appreciated was evident from the numbers who filled the rooms where it was arranged. A request was received during the meeting that the exhibit should be sent to Charleston to the meeting of the National Educational Association. This was favorably considered by the Executive Committee, and a part of the exhibit was sent.

W. F. VROOM.

THE NATIONAL EDUCATIONAL ASSOCIATION.

THE CHARLESTON MEETING.

If the success of a meeting of the National Educational Association is indicated by the number of thousands of excursionists who go along with the teachers in order to get the benefit of reduced rates, or by the number of manual-training specialists present at the meeting, the convention of 1900 could hardly be counted as a success. But if quality of program and attendance be taken into consideration, if visiting a city of rare historic interest, if being the recipient of delightful hospitality, if local interest in the discussions and an opportunity for teachers of one section of the country to get the point of view and to study the educational and sociological problems of another, are allowed to count, certainly the Charleston meeting was a success. We doubt whether there is another city in the country that could furnish a setting more appropriate for a meeting of manual-training teachers — certainly not, if it may be taken for granted that they are interested in the artistic handicraft of colonial times. Gracefully turned balusters, massive wrought-iron gates, and classical columns are everywhere in Charleston. One of our friends in the Art Department said: "I doubt if there is another city in this country where you will find as many Corinthian columns;" and another said: "Have you seen the charming bit of Italy down here?" referring to East Battery with its sea wall, its grand old colonial mansions with their wrought-iron gates and veranda guards. One quickly discovers that at some time in the history of Charleston there must have lived and wrought in the town a smith who was a master of his art. Even the iron foot-scrapers fastened to the stone doorsteps of some of the old forsaken buildings add their convincing testimony.

It was a new sensation for some of us to go along a narrow street in the evening, shut in on both sides by heavy brick walls — perhaps seven feet high — interrupted only now and then by heavy wrought-iron gates. Overhanging the walls were live oaks, magnolias, and crape myrtle just in bloom, while the tops of palmettoes still further revealed the semi-tropical character of the gardens beyond the walls. At the gateways or from across the street, one could see the stately colonial mansions with broad verandas, two or three stories high on the south and sometimes also on the east, fine classical doorways beyond which were broad halls, large square rooms with high ceiling and appropriate furnishings. Such mansions of ante-bellum days are characteristic of Charleston. Although the high walls surrounding them are extremely picturesque, yet, if one remembers the reasons for building them so high, he cannot but be glad to see that the fine residences of recent construction have neither the high walls in front nor the slave quarters in the rear.

The first session of the Department of Manual Training was given just the start that it needed by the opening address of the president, Supervisor Charles H. Keyes,

of Hartford, Conn. When Mr. Keyes began there were only thirty-five persons present, and the prospect of an inspiring meeting seemed small, but before he closed his address the audience had not only increased to seventy-seven, but had been worked up to a point of enthusiasm made manifest by hearty applause given several times. Mr. Keyes said in part:

RELATION OF MANUAL TRAINING TO TRADE EDUCATION.

"From many portions of our country come two demands suggesting the importance of careful consideration of the relation of manual training to trade education. The first is the call for the establishment of public trade schools; the second, the insistence that the public school shall, without sacrificing their general culture aims, do something more to prepare for business, vocation, or trade.

"For years manual-training teachers have urged that their work had no economic or utilitarian aims; its purpose was purely educational. They even prayed to be delivered from their friends who were fond of announcing the discovery that one of the consequences of good manual training was the development of technical skill readily turned to use in the trades. No matter how thoroughly educational the main purpose and product of such training, there is no denying that an important and inseparable consequence is the development of mechanical skill.

"The manual-training school of the future must not forget that a portion of its pupils will go to the trades. It ought to strive, without sacrificing its purely educational aims, so to shape its courses as to prepare in some measure for the trade school.

"Every trade school should give an initial year or more to manual training in order to increase the general power and intelligence of its students. There is no more dangerous agency in modern civilization than the demagogue, with ignorant labor at his back. He can do little or nothing with the intelligent mechanic or artisan, but no tyranny is so unreasonable as the tyranny of illiterate labor. But this is not enough. For, since it is one of the missions of the school to discover the pupil to himself, the manual training should help pupils decide whether to try any trade and more wisely to decide what one to undertake.

"To this end we ought to study carefully existing conditions with a view to determining how best to bring the manual-training school and the trade school into most fruitful coöperation."

On account of illness Mr. Charles F. Warner, principal of the Mechanic Arts High School of Springfield, Mass., was not able to be present to read his paper on "Teaching Trades in Connection with the Public Schools." He sent a letter to President Keyes, however, from which we quote the following:

"I suppose it will not be questioned that there is a general feeling throughout the country — at least in the foremost educational centers — that, if possible, manual-training high schools should do something to meet the growing demand for education in the trades. There certainly can be no doubt about the demand for this teaching. One needs only to ask his next-door neighbor, if he be a manufacturer, to be told that the situation in industrial quarters is alarming and is steadily growing worse. The country is flooded with inferior workmen, but the skilled mechanics are few in number, comparatively speaking, and are, for the most part, advanced in years. They were trained under the apprentice system, which, in this country, is practically gone. There are no young men under training to take their places, and

the conditions in the industries are such, at present, that there can be no adequate provision for supplying the need which was formerly met by the apprentice system.

"The most difficult question connected with this whole matter is how to connect instruction in the trades with the established work of manual-training high schools. One who advocates such a connection will probably be stigmatized as a deserter from the ranks of true educational manual training. In the early days of these schools we used to hear much said by our opponents on this very subject of teaching trades. Manual-training schools were then characterized as trade schools and as having no business to class themselves among educational forces. But these schools, although they have been favored by the general demand for the practical in education, have still defended themselves on the highest educational principles, and have won just recognition on these grounds. Now are we to recede from this position of educational manual training and teach merely trades after all? This is the question in about the form which it will be given by those who are critics of this movement. But it does not seem to me that we are necessarily forced upon such a dilemma. It is, to be sure, not an easy matter to map out a course in one or more trades which shall correlate with the essentials of academic high-school studies after the plan of the ordinary manual-training high schools, and yet I believe that this may be worked out in time. Some increase in the length of school time will have to be assumed, I think, in order to get in an amount of practice which is at all comparable with that which was formerly given under the apprentice system; and probably it will be many years before we see the teaching of trades carried to the perfection which was possible under that system in its best days. But certainly, if boys really wish to learn a trade, they must be willing to spend double the amount of time that they would give to ordinary school work.

"I cannot go much into details in this letter, but I will call your attention to a statement of the courses of instruction as outlined for the Mechanic Arts High School of Springfield. I refer to special Course B, which approaches as near to a course in the trades as we have yet been able to reach in our day school. You will notice that considerable attention is given throughout that course to the essentials of English, mathematics, science, and history, and yet an unusual amount of time is allotted to mechanic arts practice; and I will add further that, in my judgment, the time given to mechanical work will need to be largely increased, without infringing upon the academic work, in order to give the necessary thoroughness to the teaching required for the trades. I see no reason why students of a trade course, at least in the last two years of the course, should not work eight hours a day."

President Keyes called upon Mr. L. A. Buchanan, of Stockton, Cal., to explain the plan of the California School of Mechanical Arts, usually known as the Lick School. This school is unique in that it combines the manual-training school of secondary grade with a trade school. During the first two years the pupils are led to discover, in their manual-training course, which trade they wish to learn, and during the second two years they are allowed to give special attention to the trade of their choice, while at the same time pursuing one or more academic studies. Mr. Buchanan recognized in this scheme great advantage over learning a trade in a manufacturing establishment after the apprenticeship plan. In the former the purpose at all times is to help the pupil; in the latter, to benefit the manufacturing establishment.

Mr. B. A. Lenfest, of Waltham, Mass., said that much time is wasted in learning trades in shops in New England, and that he believed that the public schools should

provide the means of learning trades. Such trade teaching should be given, however, after the boy has had such preliminary school training as will enable him to make a wise choice.

By the time President Keyes introduced the second speaker of the afternoon, Colonel Francis W. Parker, president of Chicago Institute, the discussion had become so general that the meeting took the form of a conference. Colonel Parker's subject was "The Character, Content, and Purpose of Manual Training in the Elementary Schools." He spoke in his characteristic manner, proclaiming the gospel of the new education. Before he closed he declared that in the earlier years of the child's education manual training is more important than reading, writing, or arithmetic.

SKILL NOT AN END, BUT A MEANS.

He began by relating his experiences in the early years of the Cook County Normal School. He told how he became convinced that children should work with their hands in school and of the difficulties he had in finding men to teach as he wanted teaching done. The Russian system was rejected because it was tyrannical, and because it came from a country that was moving away from democracy. He sent men to Sweden to study a better system in a country moving toward democracy. "The Swedish system involves the making of useful things and is carefully graded—a beautiful idea, but not suited to American needs. It makes skill too much of an end in education. It is the same as teaching language by beginning with the study of grammar. The way to teach a child to saw is to give him something to saw; get him to saw for a purpose. The child is a member of society and as such should help to the best of his ability.

"There are an infinite number of things a child may do. He should make things in connection with his science work, his geography, his history. The sympathy of the child with primitive life is very strong. Have him make houses of early man, of Indians, Eskimos. He can make looms and designs for fabrics. Then there are Greek and Egyptian temples to be made. I count such work as play, but it has its place in school. Every school should have a garden There is nothing that focuses the work of the school so much as a garden, and there is lots of manual training in it. Things should also be made for the home. Manual training is only one feature of art. The best you can do is art. Ornament is the emphasis of function."

Superintendent Van Sickle, of Baltimore, asked: "To what extent do you object to a set of models?" To this Colonel Parker replied: "Necessity is the mother of everything when the child is given his freedom." "I appreciate," said Mr. Van Sickle, "the tendency to enslave the child. Is there an objection to having a series of exercises if the child sees the object in each?" "Get the right teacher and all will go well," said Colonel Parker.

Mr. Bennett, of Peoria, Ill., spoke in favor of a flexible course of instruction. He would allow the individual child much latitude in the choice of models — even encouraging him to invent or design some of them for himself, but he believed it to be of vital importance that the teacher influence and guide the pupil to such an extent that he be not allowed to attempt work which he cannot do well — which he himself would be sure to recognize as poorly done. He advocated the development of skill as an educational means in all kinds of manual-training work. Superintendent Van Sickle then asked the question: "Isn't skill an aid to interest?" No one answered his question in the negative.

Superintendent Powell, of Washington, spoke in favor of placing greater emphasis on the manual-training work in primary grades. He said that most of the manual training should be given to the child before he has reached the age of fourteen, and that the best time for it was before the age of ten. He also pointed out that the greater the variety of work given during the earlier years, the better for the child.

HIGH-SCHOOL COURSES.

"High-School Courses in Manual Training" was the general subject of the second session. The first paper, read by Superintendent J. H. Van Sickle, of Baltimore, was full of practical suggestions and contained answers to many present questions arising in connection with secondary education. This paper will be printed in full in a future number of the MAGAZINE. The second paper was read by Mr. B. A. Lenfest, principal of the Manual Training High School, Waltham, Mass. He began with a brief review of the beginnings of the manual-training work in this country, pointing especially to the work at the Massachusetts Institute of Technology. The remainder of the paper has been summarized by him in the following words:

"There are three later influences tending to modify this work in Boston, though the modifications are but slight: First, the kindergarten movement, working along the lines of interest; second, the Swedish sloyd system, as Americanized by Mr. Larsson, advocating the construction of the useful article as arousing greater interest; and third, the æsthetic influence, corresponding with the interest in drawing and art instruction in our public schools. Manual-training teachers should be artist-artisans; art and manual-training teachers need to get together and understand each other's aims better."

"Secondary manual training falls into four groups: First, trade schools, with a meager amount of liberalizing study, and especially weak in English work. All such schools are destined to pass away. Second, the departmental plan, with manual training as a part of the old classical high school, and under the direction of the classical principal. This plan is the most common, but is also unsatisfactory, and destined to pass into a better form. Possibly the third plan will supplant it, that is, the separate shop plan with a director of manual training not answerable to the classical principal. By this plan, pupils receive manual training in one school and do their academic work in another — a scheme open to criticism and falling far short of the fourth plan. Fourth, the separate manual-training high school, with a director chosen for his knowledge of *both* manual and academic work, who can give a due proportional share of time to all departments of the school. As it has been customary to choose academic men to take charge of such schools — men with little knowledge of shop processes — it is possible to count on the fingers of one hand good manual-training high schools. Finally, the work in mathematics, science, English, and modern languages needs to be revised and purged from much that the requirements for admission to college and technical school demand. Until then the best results are but a phantom."

The discussion that followed made it evident that there was no unanimity of opinion on several points brought forward in the papers. Mr. L. A. Buchanan, of Stockton, Cal., in opening the discussion, said that he doubted the advisability of teaching joinery to girls. This had been advocated by Mr. Van Sickle. In reply, President Keyes said that he believed that up to twelve or thirteen years of age it is a mistake to consider that there is any difference between the boys and the girls.

Miss H. F. Gower, of Los Angeles, a teacher of sloyd, was in full accord with the statement of President Keyes. Several others, however, seemed to agree with Mr. Buchanan.

In reply to a statement made by Mr. Lenfest in his paper, Mr. Keyes said that he did not see why a high school must have a principal who can go into every department and teach the classes and plan the details of the work, but he did see why the manual training would never succeed in a school where the master thought the only things of value in the curriculum were language, mathematics, and science. Mr. Bennett referred to a seeming tendency in the larger cities of the East — due, no doubt, to local conditions — toward independent Latin, English, manual-training, and commercial high schools, while the tendency in the West seemed to be toward combining these elements in schools of a broader and more general character. He referred to the courses offered at Bradley Polytechnic Institute, as possibly furnishing a suggestion to public-school authorities. He thought that, if one of the chief functions of the high school is to help pupils to discover themselves, then the school with the richer course would better fulfill its purpose as a high school.

OFFICERS AND RESOLUTIONS.

The following officers were elected in the usual manner for the coming year: president, Charles A. Bennett, Peoria, Ill.; vice president, B. A. Lenfest, Waltham, Mass.; secretary, L. A. Buchanan, Stockton, Cal.

A resolution was passed extending a vote of thanks to the retiring officers; also one to the local committee on manual training. As a result of President Keyes' address at the opening session, the following important resolution was adopted:

"WHEREAS, Great interest has been manifested in relation of manual training to trade instruction; and,

"WHEREAS, It is suggested that trades should be taught at public expense; be it therefore

"*Resolved*, That a committee of five be appointed by the president to investigate the subject during the coming year, and report at the meeting of the department next year."

The president-elect appointed the committee as follows: Charles H. Keyes, supervisor of schools, Hartford, Conn., chairman; J. H. Van Sickle, superintendent of schools, Baltimore, Md.; Dr. H. H. Belfield, principal of Manual Training School, Chicago, Ill.; Charles F. Warner, principal of Mechanic Arts High School, Springfield, Mass.; and George A. Merrill, principal of California School of Mechanical Arts, San Francisco, Cal.

THE EXHIBIT.

The exhibit was not large, but was of good quality. A large proportion of it came directly from the Cleveland meeting of the Eastern Manual Training Association. It was thoroughly representative of the best kinds of work done in each grade that it covered, and was therefore a valuable object-lesson to those who saw it. The teachers of the South especially seemed to be interested in it.

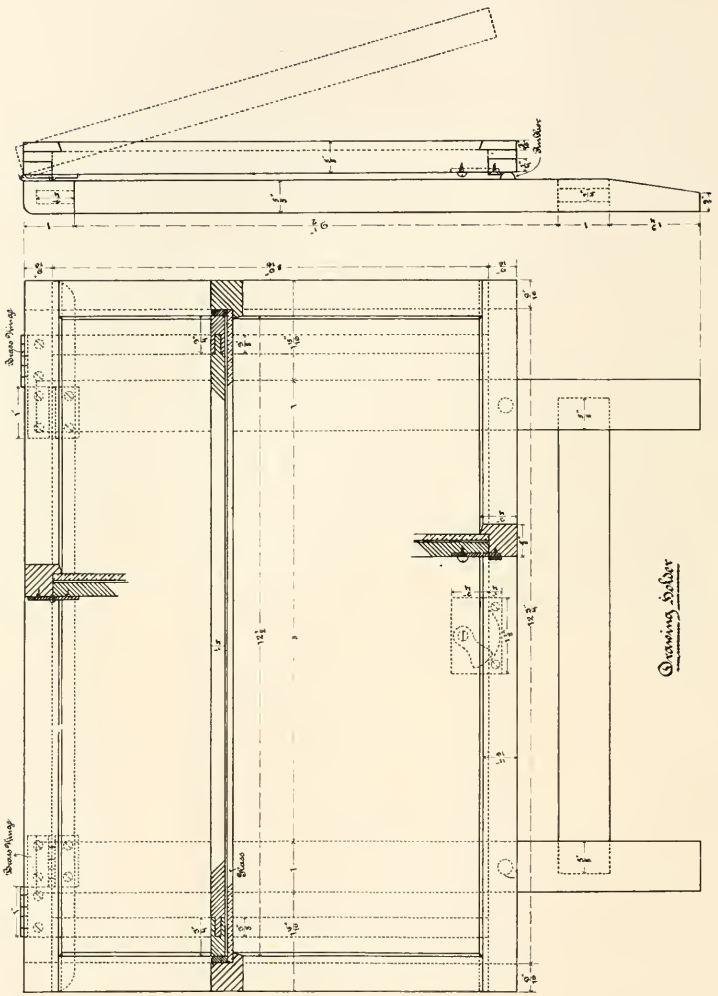
Yonkers, N. Y., sent an excellent display of work done in the primary grades — paper-weaving, cane basket-work, constructive work in stiff paper, plaiting raffia, and knife-work. Cazenovia Union School, New York, sent sewing from primary grades. The State Normal School of Millersville, Pa., sent a course of constructive work in paper, cardboard, bent iron, and wood, covering the five upper grades of the

elementary school. Newark, N. J., and Pratt Institute, Brooklyn, N. Y., took the lead in knife-work; Passaic, N. J., showed a course in knife-and saw work. Benchwork for elementary schools was shown by Pratt Institute; Sloyd Training School, Boston; Newark, N. J.; Dayton, O.; and Hoboken, N. J. The two leading exhibits of high-chool work were from Pratt Institute and Hartford, Conn. The mechanical drawing and machine-tool work gave prominence to the Hartford exhibit, while the work in forging, dressmaking, and millinery from Pratt Institute attracted much deserved attention. The Porter Military Academy of Charleston was the only southern school to send an exhibit. This consisted of work in framing, turning, and mechanical drawing. Looking over the exhibit for strikingly new and attractive features, one might stop before the cane basket-work from Yonkers, the knife-carving after the Japanese method from Pratt Institute, and the pattern-making from Pratt Institute, the new feature of the latter being a marked increase in the sizes of the pattern used for exercises. For example, the T-pipe joint was about four and one-half inches in diameter.

It is not often the case that so much of the work of a meeting, both in connection with the exhibit and the program, is due in so large a measure to one man's efforts as was the case this year. To President Keyes should therefore be given an unusually large share of the credit. From the time he began to plan his program until it was fully carried out he was obliged to meet unusual discouragements, yet from beginning to end it was his enthusiasm and skill that made the meeting a success.

The meeting next year is likely to be held at either Detroit or Cincinnati. The decision rests in the hands of the executive committee of the association, which is made up as follows: Dr. James M. Green, of New Jersey, president; O. T. Corson, of Ohio, vice president; L. C. Greenlee, of Colorado, treasurer; A. G. Lane, of Illinois, chairman of trustees; Dr. W. T. Harris, of District of Columbia; Irwin Shepard, of Minnesota, secretary.

EDITOR.


Drawing Stand

QUERIES.

1. WHICH is the best way to treat blue prints to be used by the boys? "I have tried mounting on cardboard, but perhaps somebody has hit upon a better plan."

2. How much latitude in the choice of models should be left to the teacher? and how much can be safely intrusted to the pupil's own initiative?

Wanted, five answers to query No. 2; also, five good questions for this department.—EDITOR.

REPLIES.

The blue-print holder used at Bradley Polytechnic Institute in first- and second-year shops is shown in the accompanying drawing. Two mortises to receive the frame are made in the bench-top, and similar holes in the shelf at the back of the lathes, so that one frame will serve both the bench and the lathe used by the same pupil.

The advantages of this holder are: (1) It is durable, being made of maple. (2) Drawings are easily changed. You merely swing the frame holding the drawing to its highest position and then unfasten and drop down the back; the drawing falls out. Reverse the process, and a new drawing is ready for use. (3) It is conveniently swung to any angle to suit the point of view of the one who is studying the drawing. You need not stoop; you merely lift the bottom of the frame. (4) It will hold notes, sketches, engravings, blue prints, or drawings of any size up to $8\frac{1}{2} \times 12\frac{1}{2}$ inches.

This frame was designed with the thought in mind that a course in manual training should be flexible; that the series of blue prints mounted on strawboard and coated with white shellac belong to a quarter-century of manual-training work now past; that the teacher who has his course of models so perfect that he can make no improvements in it from year to year has himself stopped growing professionally, and his drawings have become a dead language. Moreover, the thought was also in mind that a device of this kind, which invites change and variety, would be a means of preventing crystallization in the course of instruction.—EDITOR.

BREVITIES.

EAST AURORA, ILL., begins manual training work in its high school this year.

MANUAL TRAINING WORK is just beginning in the public schools of Atlanta, Ga.

MR. C. H. OAKES, supervisor of manual training in Utica, N. Y., has resigned his position in order to go into business.

MR. GUSTAF LARSSON'S definition of sloyd: Sloyd is tool work so arranged and employed as to stimulate and promote vigorous, intelligent self-activity for a purpose which the worker recognizes as good.

THE State Normal School at Winona, Minn., is about to introduce manual training. The *St. Paul Dispatch* states that the work will begin in both the model school and the normal department. It also states that Miss Tupper, of Pratt Institute, has been engaged to teach the manual training and the drawing.

IN a recent fire in Bloomington, Ill., the Public-School Publishing Co. lost valuable records and its subscription list for *School and Home Education*. Subscribers to that magazine are requested to send to the Public-School Publishing Co. at once their names and addresses and the time of expiration of their paid subscriptions as nearly as they can remember.

CHARLES D. WEBSTER, teacher of manual training in the high school of Bay City, Mich., has accepted the appointment of the government to take charge of the same department in the government school in Tacoma, Wash. Mr. Webster was graduated from the University of Michigan in 1897, and has been teaching in the Bay City High School since, with the exception of the time spent in Cuba as a member of Company C, Thirty-third Regiment. Mr. Webster was appointed a teacher in the government school in Albuquerque, N. M., a year ago, but declined it.—*Detroit Free Press.*

MR. R. CHARLES BATES, president of the Eastern Manual Training Association during the past year, has gone to Tome Institute, Port Deposit, Md., to become supervisor of the department of manual training. Mr. Bates was the organizer of the department of manual training at the Elmira Reformatory, and conducted the same for five years. Reports of the reformatory for the years 1896 to 1900 show the unique character of the work he did there. Mr. Bates has given much thought to sociological problems, and has written several articles that have been widely read. "Character-Building at Elmira" is the subject of an article which appeared in the *American Journal of Sociology* for April, 1898. The last report of the National Prison Congress gives his address in full as delivered before that body at Hartford, Conn., in September, 1899. This summer Mr. Bates has been doing special work at Cornell University.

VACATION schools are becoming more and more popular. Not only such large, crowded cities as Boston, New York, Philadelphia, and Chicago are giving attention to the pupils of their schools during the summer vacation, but the smaller cities and towns are doing summer work of the same general character. No fixed plan of work has been adopted in such schools, though manual training, drawing, and nature study are prominent features of most of them. In the large cities the establishment of summer playgrounds for children under competent supervision has become a part of the vacation-school movement. The following incomplete list of cities that have had vacation-school work during the past summer will suggest how widespread this movement has become: Boston, Mass.; New York, Rochester, and Buffalo, N.Y.; Baltimore, Md.; Philadelphia and Pittsburg, Pa.; Cleveland, O.; Chicago, Rockford, and Watseka, Ill.; Minneapolis, Minn.; St. Louis and Kansas City, Mo.; San Francisco and Oakland, Cal.

MR. HARRIS W. MOORE, who has been in charge of the Schwab Manual Training School in Homestead, Pa., since its opening four years ago, has accepted the position of supervisor of manual training in the elementary public schools of Hartford, Conn. Mr. Moore is a graduate of Teachers College, New York city, having received a diploma in both manual training and art education. Previous to taking his pedagogical course he had three years' work in the mechanical engineering course at

the Worcester Polytechnic Institute, and practical experience in carpentry; subsequently he did summer-school work at Harvard and Clark University. Woodworking has been taught in some of the schools of Hartford during the past four years, but now the instruction in that subject is being extended, and work in mechanical drawing added. Eight rooms have already been equipped for woodworking and mechanical drawing. One of Mr. Moore's problems will be to bring the work of the elementary schools into harmony with the work now being done in the high school under the direction of Mr. Charles B. Howe.

Mr. John J. Quinn, teacher of mathematics and physics in the high school at Warren, Pa., and a graduate of the Rochester Mechanics Institute, has recently invented a machine for showing the porosity of wood. Mr. Quinn's invention is designed for use in manual-training classes. The machine consists of a strong brass cylinder divided into two compartments, the upper of which contains air and the lower mercury. Below these is a cone of mahogany. By turning a screw at the top of the machine the mercury is forced downward by air pressure and through the wood. The mercury can be seen issuing in tiny globules through the solid cone of mahogany. The experiment shows very plainly the porous condition of any wood, even of such a heavy and apparently impenetrable kind as mahogany. Any species of wood may be used, but mahogany is the best, as the grain is more even. Below the cone of wood is a glass cylinder. By opening the valve and reversing the action of the screw at the top the mercury is drawn back again into the upper chamber, so that a single supply will last indefinitely.—*Rochester* (N. Y.) *Post and Express.*

BOSTON.

Through the generosity of Mrs. Quincy A. Shaw and Mr. Gustaf Larsson, principal of the Sloyd Training School, Boston, free instruction for a course of four weeks was offered the Cuban male teachers in attendance this season, at the Harvard Summer School. Seventy-five applications were received; but only forty students, representing the various provinces of Cuba, in classes of twenty, upon alternate days, could be accommodated. A room in the academic department of the Rindge Manual Training School, Cambridge, was equipped in an ideal way, as an object-lesson. Various courses in sloyd, suitable for children ranging in age from eleven to seventeen years, were illustrated by models and charts on exhibition. The instruction consisted of short talks upon the educational principles of sloyd, and bench work suitable for pupils of twelve years of age. Opportunities were given to visit several vacation sloyd schools. Pamphlets and charts upon sloyd, printed in the Spanish language, were also provided. Great enthusiasm was shown, and many expressed a desire to continue the work when opportunity should be afforded. Three of the students have been invited to remain in Boston the coming year, and take the course at the Sloyd Training School. The tools and benches used in the summer school have been purchased and shipped to Matanzas by the authorities of a school in that city.

The following appointments, as teachers of sloyd, have been made from the class of 1900, Sloyd Training School. With few exceptions the remaining members of the class of twenty-one students have also secured positions: Miss M. Selby Atwell, Glenwood School for Feeble-Minded, Iowa; Mr. B. C. Chandler, Public Grammar School, Detroit, Mich.; Miss Frances E. Daley, Public Grammar School, Braintree, Mass.; Miss I. Virginia Lyons, Public Grammar School, Newton, Mass.; Miss Anna O. Munsell, American School for Feeble-Minded, Hartford Conn.; Mr. M. W. Murray, Public Grammar School, Springfield, Mass.; Miss Mary S. Nichols, Public Grammar School,

Helena, Mont.; Mr. Chas. W. Paul, City of Boston Parental School, West Roxbury, Mass.; Mr. J. C. Tibbets, Liveridge Institute, Mattapan, Mass.; Miss Blanche S. Van Auken, Public Grammar School, Brookline, Mass.

New sloyd schools are under consideration, or are already begun, in the following named places: Braintree, Brookline, Haverhill, Reading, Southboro, Winthrop, and West Roxbury, in Massachusetts and Westminister, Vt.— CHAS. W. PAUL.

CANADA.

AS MANY of our readers are aware, manual training is to be given a good start in Canadian public schools by the munificence of that friend of education in Canada, Sir William Macdonald of Montreal. An experienced teacher and organizer is to be provided for each province, and, where necessary, one or two assistants in addition. At Brookville, Ont., and Fredericton, N. B., the schools have been opened, and a successful summer course for teachers held. For Quebec, Winnipeg, Ottawa, Prince Edward's Island, British Columbia, and Northwest Territories, the organizers are on their way, or, in some cases have already arrived.

In Nova Scotia, Truro has been selected as the headquarters of the work, which is in charge of Mr. T. B. Kidner, of the City and Guilds of London Institute. Mr. Kidner received his technological training in a famous West-of-England institution, the Merchant Venturer's Technical College at Bristol, and afterward in London at the arts and crafts schools. He was chief instructor in one of the London school board centers for some years and was then called to Bristol to introduce manual training into the public schools there. His success in that city attracted the notice of Professor Robertson, the administrator of the Macdonald fund, and he was in consequence engaged for the work in Canada. His assistant, Mr. H. G. Owen, who will shortly arrive in Canada, has been for some years in charge of a large center in London. The provincial government of Nova Scotia has taken up the matter with a will, and has already offered a grant that may amount to six dollars per head for manual training and domestic science. In connection with the Macdonald school, a qualifying course for teachers has been arranged, lasting six months, and the board of public instruction will recognize this as qualifying teachers to earn the grant offered, subject of course to their other professional qualifications being satisfactory.

The Truro school board has decided to inaugurate a teacher's training course in domestic science, in connection with their town school for that subject, and in affiliation with the Provincial Normal School.

The organization of manual training in the Province of New Brunswick is making good progress under the efficient management of Mr. E. E. MacCready, formerly of Newport, R. I., who has begun operations in Fredericton. With a view to giving a practical demonstration of the feasibility and the value of manual training a school for boys was opened in April, the results of the experiment being highly satisfactory to those interested. A summer school for normal students was maintained for five weeks in July and August. The manual-training classes for the coming year will include the normal-school students, numbering about 300, and all boys in the sixth, seventh, and eighth grades in the public schools of the city. Mr. MacCready will be assisted in his work by Mr. George M. Morris, formerly of the Boston Mechanic Arts High School. The Macdonald fund provides for the maintenance of this work for three years without government aid.

Altogether the indications are most hopeful for the spread of the good work.

CALIFORNIA.

IMPORTANT changes have taken place in the manual-training work in San Francisco. Mr. Cree T. Work, of Greeley, Colo., has been appointed supervisor of the new work in the grammar grades. Mr. Work is a graduate of the State Normal School of Indiana, Pa., and from the Sloyd Training School, Boston. During the past year he has held the manual-training fellowship at Teachers College, New York city, receiving the higher diploma of that college in June. His teaching experience covers six years in Pennsylvania and seven in Colorado. Mr. Work arrived in San Francisco about the middle of June, and began manual-training work in two centers on August 6. Seven rooms have now been equipped for seventh- and eighth-grade boys. The work will not be extended to the lower grades this year. The Americanized sloyd system will form the basis of the work; invention, apparatus-making, observation of skilled industry, collections of samples, discussions pertaining to materials, and correlation with the other subjects in the curriculum will form prominent features of the work. Mr. Work has the following assistants: Mr. Everett E. Goodell, Massachusetts Institute of Technology, formerly instructor in the mechanical department of the State Reform School at Portland, Me., and later instructor in manual training in the high school of Austin, Tex.; Mr. Archie L. Read, Throop Polytechnic Institute, Pasadena, Cal., including normal courses in wood and iron-working; Mr. Charles H. Thorpe, State Normal School, Los Angeles, Cal., including special courses in manual training, formerly teacher in Whittier, Cal. public schools; Mr. M. Doyle, artist in clay-modeling and wood and ivory carving, formerly instructor in manual training in the Lincoln and Irving Scott schools of San Francisco; Mr. B. F. Simcoe, State Normal School, Missouri, Throop Polytechnic Institute, Pasadena, formerly principal of graded schools in Missouri, and later teacher of sloyd and manual training, San Diego, Cal.

Sewing and cooking are also being taught in the same centers as the wood-working. Miss Kate Whittaker is general supervisor of the cooking. In drawing, Miss Dee Beebe, a graduate of Teachers College, New York city, and during the past year a teacher at the California School of Mechanical Arts, has been elected supervisor of the primary grades. Miss Katherine M. Ball, formerly supervisor for all the grades, will now give her entire attention to the grammar grades.

The Polytechnic High School drops all commercial work and becomes distinctly a manual-training high school. Important changes have been made in the building, and its equipment has been increased.

The Wilmerding School of Industrial Arts has made a good start in the building trades. Mr. Percy Walker has been elected instructor of bricklaying, and Mr. H. A. Wood instructor of plumbing.

In Stockton Mr. W. S. Rice, of Philadelphia, has been elected to assist Mr. F. H. Myer in drawing. Mr. Myer, being relieved of some of the grammar-school work, will extend the work in the high school.—GEORGE A. MERRILL.

Aside from the work in manual lines already established in the Los Angeles city schools, systematic work in cardboard construction will be introduced in the third and fourth grades and carried on under a special supervisor. Cookery will be established in six additional buildings for the girls of the seventh and eighth grades. Superintendent Foshay has thus succeeded in introducing manual training in all grades below the high school.

Miss Anna C. Faulding, of the sloyd department, Los Angeles, who was last year on a leave of absence, will remain abroad the coming year. She is at present in Cassel, Germany.

Miss Lena Ingraham, formerly supervisor of drawing and manual training at Anderson, Ind., will introduce and supervise drawing and manual training in all grades of the Lugonia School, Redlands. She will be assisted by Miss Florence Fortson. The work will include courses in cardboard, whittling, and sloyd. Miss Ingraham has had charge of the manual work in the summer school conducted by Manager C. C. Boynton, of the Fisk Teachers' Agency, in Los Angeles.

The Citrus Union High School will introduce free-hand and mechanical drawing under Miss Elsie Whitman. It is also probable that coöperative work may be carried on, so that sloyd and cardboard construction will be introduced in the schools of Claremont, Corina, and Azusa.

Miss Gertrude Ritchie, of the State University at Berkeley, will introduce and supervise manual training and drawing in Santa Monica. Manual training will be introduced in the city schools of Alameda this fall. The high school at Pacific Grove will this year introduce sloyd into the ninth year of the course.

Mr. Albert F. Olson, graduate of the sloyd normal department, and A.B. in mechanical engineering, Throop Polytechnic Institute, will supervise manual training in San Diego.

At Stanford University drawing from the nude has been abolished. At first the men and women were separated in their class work, and lately the final step has been taken.

At Throop Polytechnic Institute Mr. Frank H. Ball, formerly of the Chicago University, will teach forging. He will have charge of the manual work in the grades, and of the wood, iron, and machine shops. Mr. Ball will certainly add great strength to the teaching power of the institute. Mr. W. W. Martin will be instructor in the wood shop; Miss Ida Mellish and Miss Nellie Moore will teach in the sloyd department. All are graduates of the institute. Miss Mellish has been pursuing study in manual lines in the East this summer. Mr. Robert E. Ford, instructor in machine shops, is investigating methods in the East. His position will be occupied until his return by Mr. Leslie Heald. Miss F. F. Sterrett, of the art department, who is studying in Europe, will not return until the holidays. Mr. R. J. Sterrett, her brother, of Stanford University, will act in her place until her return.

Mr. Charles Miller, of the Los Angeles State Normal School, has been conducting a summer session in manual training.

Los Angeles county, through its board of education, has introduced manual training into the course of study in the first, second, third, and fourth grades of the county schools. To meet the demand on the part of teachers in these grades, a summer session was held at Throop Polytechnic Institute, August 13 to September 7, under the direction of Arthur H. Chamberlain. He was assisted by Miss Jane Langley, formerly of Hampton Institute; Mr. A. L. Olson, Mr. W. W. Martin, and Miss Ella V. Dobbs. Courses were offered in elementary manual training for the first and second grades, elementary cardboard construction for third and fourth grades, a course in advanced cardboard, and one in sloyd. Mr. Chamberlain also offered a course in the theory of hand-work and in applied psychology. Some forty teachers from southern California were in attendance. The director has drawn up a course of study in manual training to be used in the schools of the county.—ARTHUR H. CHAMBERLAIN.

EDITORIAL.

In the January number of the Magazine we called attention to the growing interest in manual training, but we did not at that time foresee any such forward movement as has taken place during the past few months in certain sections of the country. We were prepared to see the growth in New England, where manual training has been steadily pushing forward during the past seven years or more; we were also aware of the forces at work in New York state and her sister states along the middle Atlantic coast; we expected to see the South come forward in due time as it is now beginning to do, and to see moderate growth in the middle West, but we were not prepared for the remarkable development which has taken place in Michigan and in California. In Michigan but little work had been done in manual training up to a year ago. The report of the Commissioner of Education for 1897–98 named three cities in Michigan as having manual training in their public schools: Ishpeming, Menominee, and Muskegon, and in these no work below the seventh grade. During the past year at least five important cities have introduced manual training. The city of Kalamazoo took the lead in this movement. On June 5, 1899, her school board voted $4,000 for the introduction of manual training. Mr. George S. Waite, formerly of Toledo, O., was engaged as supervisor, and on March 6, 1900, 1,420 pupils, or about half the number in the city, were receiving instruction in manual training. This work covered grades from five to ten inclusive, and for both boys and girls. In Detroit a comprehensive scheme of manual-training work was begun on January 12, under the supervision of Mr. J. H. Trybom, of Boston. East Saginaw adopted manual training in March, and has recently appointed Mr. Foster H. Irons, of Cleveland, O., as supervisor Ann Arbor voted for manual training on May 10, and West Saginaw in June. What appears to be such a sudden awakening was, without doubt, the result of years of agitation and of thorough study of manual training in eastern states, yet it is none the less significant. Recent developments in California, centering in San Francisco and Los Angeles — fully reported in the Brevities column of this and the July number of the Magazine — are perhaps even more extraordinary

and far-reaching, as they seem to clear the way to a comprehensive and effective system of manual training throughout the state. Let the good work go on.

SHALL trades be taught in the public schools? This question was prominently before the Manual Training Section of the Charleston meeting and will come up again next year. We have become so accustomed to answering this question in the negative that to do otherwise places one in the list of the radicals. As teachers and advocates of manual training, we have been, and are still being, particularly careful to have it understood that manual training is not trade teaching, but that it is an essential and an integral part of a good general education. We have been continually pointing out how one-sided any education must be that neglects expression through constructive manual activity. Now that this manual training idea has but just received general recognition and approval, and is still in need of approval in many places, there is danger of misunderstanding and confusion when teachers of manual training begin to advocate the teaching of trades at public expense. There ought not to be, however, and we believe there need not be, if all will remember that the difference between manual training and the teaching of a mechanical trade is similar to that between arithmetic and accountancy, or between nature study and the study of medicine. The former is related to the latter, but it is not the same thing; it is more elementary and of infinitely wider application. The introduction of manual training into the schools certainly does not imply that the teaching of mechanical trades must follow any more than the presence of nature study implies that the study of medicine should follow it in every public school. Moreover, the question of trade education has not sprung up in the night in one corner of the educational field; it reaches far beyond the realm of the mechanical trades. It covers a wide area and is a direct result of the professional study of economic conditions, and the prevailing desire on the part of educators to adjust their educational system to present social needs. To what extent should this adjustment be made? is the real question. Shall we carry our present practice in the matter of specialization and elective studies in the secondary schools one step farther and train stenographers, accountants, newspaper reporters, machinists, dressmakers, carpenters, draftsmen, designers, milliners, and all of the rest?

The question of trade education has come up at this time in connection with manual training for two reasons. First, there is an

increasing demand for practical instruction in the leading mechanical trades. It is almost impossible for boys to get such instruction in a reasonable length of time in the manufactories, and we have but very few — a half-dozen, possibly a dozen — good trade schools in this country, and these are nearly all for special classes, and therefore are beyond the reach of most boys. American young men find it difficult to compete with those who come from the trade schools of Europe. Second, the manual-training high schools are doing more than any other agency to relieve this condition. They offer instruction in the fundamentals of many trades, though they do not aim to make their pupils proficient in any particular one. Such a program does not fully meet the demand for trade instruction, but it is a help and it suggests the possibility of a modified program that might meet it. The question then is, What modifications would be necessary, and would these essentially change the present manual-training high school program? In other words, can the manual-training high school aim and the trade-school aim be satisfied in the same school? or are they incompatible?

It is easy to see that with some modification of the program of studies followed in the manual-training high schools, especially allowing all or nearly all of the shopwork to be done in the direction of a single trade selected by the pupil, these schools might become technical or trade schools of secondary grade. This would be brought about, for the most part, by specialization in shopwork and allied subjects. But would this meet the present demand for trade education? and would it not defeat the present aim of the manual-training high school? The aim of a trade school we understand to be to make its pupils acquainted practically with trade processes and skillful, to teach principles underlying such processes, and to give enough general education to enable its pupils to become good citizens, this latter being very indefinite in amount. The trade school presupposes that the pupil has decided that he wishes to earn his living at some trade, or some occupation growing out of it, which he has already selected, or will select soon after entering the school. The manual-training high school, on the other hand, aims to give its pupils a broad, general education without foreordaining them to occupations which they may discover later are not suited to them. It never presupposes that a pupil is going to find his life-work in a mechanical industry. It keeps the whole field of human effort open until he graduates. It may discover his bent and encourage him to follow it, but it closes no doors

to other occupations, except in so far as allowing electives in language work has a tendency in that direction. Now the manual-training school fails to meet the demand of the trade school because it has set its face against specialization which can, by any possibility, predestine its pupils to a few occupations; and the trade school falls short of the manual-training school standard because, by insisting upon a much higher degree of specialization, as it must, it cannot possibly cover as broad a field in the same time. If this be true the question arises, shall we revise our high-school creed? This question would seem to bring us back to the question we asked in the beginning: Shall trades be taught in public schools? and to the larger one: What is the function of the public school? It is nothing less than this question, and its corollaries, with reference to a definite line of specialization that is before the committee on relation of manual training to trade education that was appointed at the Charleston meeting. This committee is likely to discuss the same questions of specialization that have recently been discussed by Dr. Hugo Münsterberg and others. Their report is sure to be looked forward to with great interest. The committee is made up of men of high standing and broad experience, and we may confidently expect to have penetrating light thrown upon this now very obscure problem.

REVIEWS.

BOOKS.

Cardboard Construction. By J. H. Trybom, assisted by Ellen F. O'Connor and Abbie E. Wilson. Rockwell & Churchill Press, Boston, 1899; 6 × 9 in., pp. 70; price, $1.—This is by far the most satisfactory book on this subject that we have ever seen. It ought to meet with a warm welcome from the regular teachers in the lower grammar grades, who will find it a most helpful manual, and it certainly will be appreciated by specialists in manual training. In the introductory chapter the author discusses some of the principles underlying a course in manual training for the lower grades. The second chapter is given up to "Exercises, Instruments, and Material," in which the fundamental tool operations are briefly described, and practical suggestions to teachers given. Then follows an outline of six preliminary lessons, and drawings and directions for making seventy-six models which are intended to constitute a course of instruction for the fourth and fifth grades. The author evidently speaks from experience when he says: "For the educational value of the work the first few lessons are of the greatest importance. In these the foundation is laid for a certain working method, a certain procedure in doing the work. If the teacher does not emphasize during these earlier lessons, over and over again, that the pupils

must work slowly and carefully so as to reach accurate results, the value of the most interesting cutting and pasting exercises will be seriously impaired."

Though the models are drawn and constructed by mechanical means, they are, almost without exception, pleasing in proportions and in every way well designed. It is noticeable that string or yarn is used in fastening during the first year, paste being reserved to the second. With the exception of a few of the earlier ones, all the models are intended to be useful to the child.

Much emphasis is placed on the progression of exercises. In his introductory chapter the author says: "The progression of the exercises should be such as to manifest to the pupil a constantly growing power. We should never at any stage of the work ask a pupil to do what he cannot do well. His work in manual training should be a line of continuous victories over difficulties gradually increasing, but not surpassing his power at any stage. Continued failure is worse than no attempt at all. Success is a greater factor in the educational value of manual training than in any other subject."

The illustrations of the book are excellent. The working drawing of nearly every model is accompanied by a perspective sketch which shows how the model will look when completed. The directions for making the models are brief and to the point.

If one were to allow himself to be hypercritical, he would say that the book has one fault which is common to many courses at the present time; it lacks flexibility. It is adapted to the average or typical child of specified grade, but its arrangement does not indicate that it is in any large degree adapted to individual children. This, of course, is a difficult thing to accomplish, and rests largely in the hands of the teacher. Nevertheless, we believe that such a book might offer more suggestions to the teacher who is working with that ideal before her, and perhaps also might suggest how the child's inventive faculty can be utilized to some advantage.

School Sanitation and Decoration. By Severance Burrage and Henry Turner Bailey. D. C. Heath & Co., Boston; 7¾ × 5¼ in., pp. xvi + 191; price, $1.50.—In this volume is gathered together in readable form the best that has been said during the last few years concerning school buildings — their location, construction, sanitation, decoration, and furnishings. All this is done not merely with reference to the large city school, but with reference to the small, one-room country school as well. Its mission is to advocate preventive medicine, promoting health and beauty everywhere in schools.

The book is most attractively illustrated with explanatory diagrams, plans and elevations of buildings, photographs of furniture and decorated interiors, and a large number of reproductions of masterpieces of art, suitable for decorative purposes. No one should plan a school building before reading the book. However, it is not written for architects, but for school officials and school-teachers; every teacher is sure to find in it numerous practical suggestions for everyday use. Read once a year, and keep in a convenient place for reference, would be a good rule with this book, for it is well that teachers — even the best of them — be reminded often of the conditions that make for the health of their pupils; and surely none of us are likely to be sated with practical suggestions that will help us to put more of beauty into our schoolrooms and into our school work.

Constructive Work. By F. Robert Bartsch. Normal School Publishing House, Chicago, Ill., 1899; 9 × 8½ in., pp. 100.—This book tells how to make a great many

useful objects out of paper, cardboard, leatherette, and the like, but it does not attempt to arrange the objects into a course of instruction. Each article to be made is allowed a separate heading in the book, and under this is given (1) a list of the tools used in making the object, (2) the material needed, (3) working directions, and (4) the cost of the material on the basis of a class of forty pupils. Many of the more difficult articles described suggest some of those in the cardboard course followed at Leipzig. The book will be helpful to many teachers, but there is one fault in it which seems hardly excusable: in its illustrations it has set a very low standard of drawing before the teachers. This is particularly marked in the working drawings and the stippled mechanical perspectives. A book for teachers should tend to elevate, not degrade, standards of workmanship in drawing as well as construction.

Small Engines and Boilers. By E. P. Watson. D. Van Nastrand Co.; 8 × 5½ in., pp. 108; price, $1.25.— The volume gives a careful description of a 5½ horse-power vertical engine and a 1½ horse-power horizontal engine, together with a small vertical and horizontal boiler. The written matter is supplemented by detail drawings of all parts. The work will be of greatest service to the amateur mechanic in giving directions for machining and assembling parts of small engines.

F. D. CRANSHAW.

North American Forests and Forestry is the title of a new work from the pen of Ernest Bruncken, secretary of the late Wisconsin State Forestry Commission. It is a book of 262 pages, 8½ x 6 in., and is published by G. P. Putnam's Sons, New York city. Price $2. The book is divided into twelve chapters, with such headings as "North American Forests," "Forest and Man," "Forest Industries," "Forests and Forestry," "Destruction," etc. The general reader will find in this book much that is interesting, as Mr. Bruncken's description and style are superb, but it is the wood-working instructor, looking for "class talk" material, who will find it of greatest value. The book contains a well arranged index.— ROBERT G. WEYH, JR.

Directions for Surveying and Arranging Home and School Grounds. By Warren H. Manning. Published by the Author, Boston, Mass. A very suggestive little book containing twelve pages amply illustrated.

PAMPHLETS.

Manual Training in Public Schools. By Jas. W. Robertson, Commissioner of Agriculture and Dairying for the Dominion of Canada, and in charge of the Macdonald Sloyd School Fund.— This is a revised report of an address given before the public school board of Ottawa, November 2, 1900, in which he announced the gift of Sir William Macdonald to the provinces of Canada. The report deals with the present defects in education and shows how manual training is providing a corrective for some of them. His review of the conclusions reached in Ireland with reference to the introduction of manual training, and of the work now being done in the board schools of London, add much of interest to the report.

The following have been received:

Manual Training Syllabus. High School Bulletin, No. 9, University of State of New York, Albany, N. Y. Price 10 cts.

Course of Study. Chicago Institute.

Manual Training. Department Announcement, Teachers College, Columbia University, New York, N. Y.

MANUAL TRAINING MAGAZINE

JANUARY, 1901

THE MANUAL-TRAINING OUTLOOK.

C. HANFORD HENDERSON.

IT is a bit dangerous to commit oneself to a given title before one's article is actually written, for the mind has a way of taking unexpected by-paths. But I see that I am already committed, for Mr. Bennett has it all set down in plain black and white — or, to be quite accurate, in black and yellow-green. However, I am not sorry, for the title is general enough, and it gives such very plain warning that the article may be in part reminiscent as well as prospective.

Some sixteen years ago — that is to say, in 1884 — when I was a very junior member of two august scientific societies, the American Association and the Institute of Mining Engineers, fate or destiny or good fortune, or whatever you may choose to call it, decreed that these two bodies should meet at the same time in Philadelphia, and, further, that it should enter the heads of the local secretaries to arrange a joint excursion of learned people to the anthracite coal regions. As the British Association had come down in a body from Montreal to visit its American cousin, we had a triple alliance of the first order. In addition to all this — it was in September — the weather was as hot as only Philadelphia knows how to produce it. These conditions conspired to make an out-of-town excursion very popular, and the special train which carried all this learning to read the transactions of the carboniferous age was as full of people as they were of ideas. There were three in my own party, and, American cars being planned for couples, I sat alone in the seat back of my friends, leaving a vacant place at my side. It happened — I shall now call fate undeniable good fortune — that a tall, gray-haired gentleman hunting for a place selected this one. I gave my permission without any suspicion that the act was momentous. But so it turned out. It was not a man, but destiny itself, that sat down beside me, for the stranger proved to be

Dr. Woodward. As he was alone, I presented him to the ladies of my party, and we formed a friendly quartette for the day. I need not say that Dr. Woodward talked about manual training; for, like some of the rest of us, I believe he always talks about it. And he talked so well that before the day was spent he had aroused an interest in my own mind that afterwards became an enthusiasm and colored the activities of succeeding years. I had never heard of manual training as a scheme of education; had not, I think, even seen the two words in neighborly association; but the idea was immensely attractive and was bound to carry one along with it. I am indulging in this retrospect partly, I suspect, because I like personally to dwell upon it, but mainly because it overwhelms one with a sense of the immense amount of history the movement has made in less than a score of years; and because it gives me a chance to say, *à propos* of the present outlook, that, had Dr. Woodward and I amused ourselves that hot September day in drawing rose-colored sketches of the future of manual training, our wildest forecast would have fallen far short of the present reality. We could not have foreseen that, with the opening of the new century, manual training would have taken such hold upon the public mind that it would penetrate to every quarter of the civilized globe, and even to India and the Sandwich Islands; that it would permeate the entire fabric of our own public education in America; that the establishment of manual-training schools should become in some states a compulsion of the law, or that private individuals with fortunes hunting for service should vie with one another in founding institutions for its extension. We could not have foreseen that the movement would demand a magazine of its own, with an editor in Peoria, a press in Chicago, and contributors literally scattered from the Atlantic to the Pacific, from the great lakes to the gulf; or even that we ourselves should be announced as two rush-lights pointing the way to a brighter day.

Such a retrospect can hardly be said to make one cautious in prediction — for manual training has still the impetuosity of youth — but it does at least make one conscious that one is here dealing with a tremendous force, and it does make one feel the uselessness, not to say the impertinence, of trying to speak any longer for the movement as a whole. There are as many conceptions of manual training as there are minds dealing with it. One can only report the currents which one detects in that particular part of the flood which goes sweeping through one's own field of vision. And if one mistake an eddy for a current — well, it is a risk that one must be willing to run.

In the first place, then, it must be confessed that the instant growth of manual training suggests the mushroom, the rocket, the comet—things that spring into being and then as rapidly fade. The crude assertion that it has come to stay carries no weight with it. That has been said of many another novelty. It was said of the bicycle, and already one sees it perceptibly paling before automobiles, moving platforms, and other locomotive eccentricities. Nor is it significant that manual training is contagious. Something may happen and we may find ourselves immune. Whether manual training is to be an abiding force in modern education or not depends entirely upon the idea back of it. The term is but a symbol. The form persists, but the thing symbolized is as variable as human passion. Manual training in America is not yet a quarter of a century old, and already it means many things to many minds. Today it means something quite different, I venture to say, even to my three friends, Mr. Larsson, Mr. Sayre, and Dr. Woodward. They all deal with wood and with tools and with boys, but they are not all after the same sort of pudding. In fact, I suspect that they have quite dissimilar products in mind. If we can make manual training symbolize an educational method by which we realize a progressive purpose, a purpose that is essentially an expression of the larger self, that is essentially catholic and eternal, that is at heart social and human, then manual training will be the abiding force that we hoped it might be. We may read in its sudden growth the hospitality of the human heart to the things that are abiding and good. But if—and I wish that Isaiah himself could say it for me—but if manual training separates itself from this warm current of human and social life, and becomes a mechanical pursuit, an end in itself, a mere trick of craftsmanship, then the human life which it declined to serve will have done with it, and will leave it quite aside, along with other discarded masks and trumpery.

And so I am not at all dazzled by the tremendous onrush of this movement into which I threw the heat of youthful energy. It is still on trial, and will always be on trial. It is only one more among many human possibilities. It may turn out to be a comet, a seven-days' wonder and be gone, or it may prove a new light.

This sober view of the case seems to me salutary. But it need not be discouraging, for affairs have not yet turned, and the future is still in our own hands. At the present moment the manual-training world, like other intellectual territories, is the battlefield of conflicting ideals, and this in a dynamic society is the sign and symbol of vitality. It is

a part of the flux and flow of things. And this brings me finally to the very gist of what I have to say: *The persistently good ideal in manual training is the persistently good ideal in life as a whole.* If the manual-training idea fall into the hands of men with a small outlook on life, it will go to the wall with the rest of their petty equipment. But if it fall into the hands of men in whose being circulates the rich red blood of a high purpose, it has an immense service to render the coming generations.

It is too much to expect in such a composite life as we now have in America that there should be the solidarity of purpose that once characterized the colonies. We have too many dissimilar elements for that. Socially speaking, our several communities and commonwealths are at very different stages of evolution. It would be moderate to say that between the most evolved and the least evolved there is a gap of over a hundred years. And then in the same state, in the same town, in the same household even, such tremendous differences are observable. I am not deploring the fact; I am merely stating it. If America stand for anything, it stands for human hospitality. It is the refuge, the asylum for those in quest of better things, and this as much today as in 1620. It is the theater for a larger activity, and should it ever close its doors to these human needs, as we too often hear it urged, it would stand before the world a perjured thing; it would not be the America of Emerson and Lincoln and Whitman. But the important thing to recognize in this seething, incoherent democracy is that the process of education is not the acceptance of the voice of the majority, however hospitable one may be to its presence, but it is, to use Mr. Davidson's fine phrase, the constant, unwavering endeavor to lift this humanity out of its original nature into its ideal nature. The true democrat is the one who proclaims that there is a better destiny in store for the people than the majority is yet demanding.

I am writing on the beautiful shores of Lac Léman, and from the great south windows of my château I look across the waters to Geneva, a city whose history, brave as it is, is a constant object-lesson against obeying too unquestioningly the popular voice. In this very capital of the Reformation the passion for goodness became, in its unchastened, unideal manifestation, the practice of evil. It was here that John Calvin, reported to be good, the Protestant of Protestants, found it possible to seize a quiet visitor, poor Michael Servetus, and burn him at the stake, the great council approving, for no larger crime than having expressed his own views on the doctrine of the Trinity. Had I been

the guest, we had differed on many questions, and doubtless the good Mr. Calvin would have had me drawn and quartered and then burned, along with many others of my friends, who have still, I think, considerable capacity for serving America and the world. All this was near three hundred and fifty years ago, it is true, and in the meantime the *Zeitgeist* has become less directly carnivorous, but one cannot take even such a peep into the past and hold with any great degree of assurance that the voice of the people is the voice of God. It is quite as likely to be the voice of the devil, and we can best defeat him by bearing this in mind.

To declare that the present moment is critical is rather a cheap way of soliciting attention. Every moment is critical. To live quietly in one house for a score of years does not prevent each day from being a crisis, for each day one might have moved out and so met quite a different destiny. But nevertheless the present moment does seem a particular crisis. Since the days of the Civil War we have been so busy exploiting the continent and the workers, so busy getting enormously rich, that we have not as a nation been blessed or cursed with any special self-consciousness. We have met the day's work and done it. But the events of the past three years, the thought that we are really a member of the great family of nations, and the still more intoxicating thought that we are a very lusty and vigorous member, all this has conspired to turn our heads a bit and put us in the position of an elder son who comes home from quiet college days to find himself a man and the acknowledged heir, a person of power. It *is* a critical moment. We are the great republic, and we have suddenly become conscious of the fact. We have come of age. And the particular crisis is as to what use we shall make of our power, this newly recognized power of our lusty manhood. To use Mr. Davidson's phrase once more, the "original" nature of power is to compel, to conquer, to crush; it is to subdue others and assert the self. But the "ideal" nature of power is something quite different from this. It is to serve, to uplift, to inspire; it is to master the self and to rationalize the world. One may well hold one's breath when such issues are at stake.

We must be prepared to witness some display of the original nature of power, and we must not be discouraged. It is, for example, rather a crude use of power, at the present stage of the human game, in this year of grace 1900, to go about shooting people and blowing them to pieces, and then triumphantly waving over their dead bodies either a red flag or a flag that is red, white, and blue. The Anglo-Saxon loves

supremacy, and he has committed grave crimes to attain it, but that is not the whole of him. Under his domineering, ungracious shell he has still a heart and an instinct for justice, and in the long run it is safe to appeal to it. The imperialist party in both England and America is beginning to find this out. Not even Mr. Kipling's verses, or Mr. Roosevelt's too able advocacy of the strenuous life, or Mr. McKinley's gross misuse of the English language can longer blind us to the fact that conquest and aggression belong to the original and not at all to the ideal nature of power. I take it that the cause of military imperialism has been fought and lost. It has well-nigh reduced England to the position of a second-rate power, and for the moment has caused her people to be cordially disliked, a dislike which is making itself felt in a very sensitive part of the English makeup—in its pocketbook. English aggression is making the world-markets chilly toward English manufactures, and this is a bread-and-butter matter that may not be dismissed with fife and drum. In America the cause of military imperialism is far from being dead, but as a political movement it is fortunately in the hands of trimmers who are already trying to cover their retreat with concessions and fine-sounding phrases. Doctors want patients, and lawyers want clients, and schoolmasters want pupils. It is very natural. So West Point and Annapolis and Washington want campaigners, and are carrying into the twentieth century their mediæval chant of the glories of war. But, happily, the people do not want anything of the kind. They neither want to pay the bills nor to deputize the glory.

The original nature of power does not spend itself, however, in gunpowder alone. That is only the first savage instinct. There are other ways of compelling and conquering and crushing. There are different ways of subduing others and multitudinous ways of asserting the self. The imperialist spirit is most picturesque when it is military, but, falling upon an unappreciative age, it will consent to other embodiments, to subtler forms, to more hidden aggressions. There are thousands of people in America who have the wit to reject military imperialism, who belong perhaps to anti-imperialistic leagues and the like, but who are quite hot for compelling and conquering and crushing in a commercial way, who are for subduing business rivals and asserting the moneyed self. This commercial imperialism is less often called in question, even though it be an aggression against the neighbor, the fellow-citizen, the compatriot, as well as against the foreigner; but I cannot myself stomach it with any better grace, for it is the same

drunken abuse of power and costs even more human lives. Military imperialism is intermittent: it has its breathing spells and its truces. Commercial imperialism is incessant. Suppose we do give up our *possessions* in the Philippines, suppose we do restore Cuba to its people, suppose we do in all sincerity return to the honorable traditions of our fathers, we have not for one moment parted company with imperialism if we go on trying to enslave the rest of the world commercially, if we go on putting mechanical victories ahead of spiritual ones, if we go on valuing trade operations above the acquisition of character, if we go on striving for material wealth rather than human wealth. The ambition to be wealthy is in itself an imperialistic ambition. It is the desire to command others and to make them serve us. It can be gratified only in the same way that we all go out of town in summer — that is, ten thousand or twenty thousand of us go, and the toiling millions remain and swelter. Why should we want to grow wealthy in this individualistic way? Every nation that has got wealth of this sort has at the same time committed suicide. We have no reason to think that we should escape the common fate. We have undeniable power. We can hardly claim too much for America. And no one, I think, feels this more deeply than those who have lived for a time in Europe. We have immense material resources — mine and forest and field, nature in her most prodigal mood. We have immense social opportunity. Suppose we should use this power on its ideal side for gentle human service, to uplift and inspire our brother. Suppose, having generous food and shelter, we should take advantage of the respite, to master the self and to help rationalize the world. It seems to me the gods have brought a possible Olympus very near to earth!

I have recently been in Paris. I cannot say that I have seen the exposition, for it is quite too big a thing to see unless one make a very serious business of it; but my comrade of an afternoon, Professor Geddes, pointed out a matter that seemed to me deeply interesting. It was this, that the exhibits of the small countries were so much more excellent than those of the large ones. We saw nothing so intelligible and so altogether charming as the building of little Finland, and after that, perhaps, of Norway. By the side of this simplicity and genuineness, our own exhibits and those of the aggressive nations seemed overburdened, tortured, even vulgar. Standing in that Rue des Nations, one is tempted to ask: "Would it be better to have the love of the whole world, or to have its trade, or to have its fear?" And the heart answers very quickly: "It were better to have its love."

We find ourselves, then, in the midst of conflicting ideals, between imperialism and Christianity, between the temptation to use power on its original, brutal side, and the inspiration to use it on its ideal, human side. *And manual training has precisely the same outlook.* It is the agent of a social purpose, and it may be carried out either imperialistically or humanly. And I so much insist upon keeping this distinction in mind because one is prone to think that, bricks being bricks, manual training must be manual training. In reality, as I have tried to show, manual training means just what you choose to have it mean, and nothing more or less. It has in itself no talismanic virtue. It may be used to serve either of two masters.

To use manual training imperialistically is to use it for material, technical ends. It is to displace the older humanistic education by something that is not education at all, but a mere utilitarian training, a mere trick of craftsmanship. And I entirely sympathize with those who protest against this robbery. There is an entirely legitimate place for technical training, but it is later in life. At fourteen a boy is too young to interrupt the culture process, much too young to know what will be the true occupation of his adult life. I have seen — and who indeed has not? — the very sad effects of this too early specialization. A boy of fourteen is full of fancies, and it is perfectly right and wholesome that he should be. The harm comes when these fancies are taken too seriously. Let them occupy his leisure time. Let him run the whole scale of boyish interests,— let him be the naturalist, surveyor, mechanic, electrician, astronomer, artist, musician, poet, philosopher. Let him go in for them heart and soul, and then, quite as light-heartedly, let him drop them. You make a sad mess of it when you hold a boy to an outgrown interest. Remember that at an earlier age he very probably wanted to be a cab-driver or a motorman, and there are few little boys of a serious turn of mind who are not at some time in their lives quite sure that they will be missionaries. But meanwhile the process of education, by which the lad passes from his original nature of unevolved instinct into the richer, more social, more human region of his ideal nature, must suffer no such waywardness. It must be the steady unfolding and perfecting of the human spirit. And this is not a commercial end. At the last it does not neglect the question of homely bread-and-butter service, for only when a man *is* self-supporting can he idealize his social relations; but it does relegate this question to its proper and secondary place, remembering the words of a certain teacher, much

quoted but little followed by the imperialists, who had something very effective to say about a man's not living by bread alone.

To use manual training imperialistically is to neglect this self-mastery, this harmonious development of the inner life, this sentiment and practice of gentle human service, and to go in for an exterior gain, a marketable skill with which to compel and conquer, if need be crush, a competing world; a skill that may be used for outer subduing and for asserting the self. To pursue manual training solely for bread-and-butter-and-marmalade ends is to pursue it most unworthily. And the product of such training is quite what one might expect. It is crude and unlovely. If the man has been done for, we do not care for the statistics of his productiveness. And here I would propose a very simple test: look into the faces of the boys who attend these utilitarian schools, impertinently so-called, and then into the faces of the boys who go to educational schools, and ask yourself quite seriously which type you would wish to prevail. Indeed, I will go a step farther and ask you to look into the faces of the young men, the very best of them, who go to technical schools in place of college, and the young men who go first to college, and then to put the same question to yourself.

Manual training may be used to serve power along its original, brutal side, and to do it very effectively. It may be made to cover trade operations and to convert our American lads into clever artisans, artisans who will skillfully produce cheap goods with which to subdue the rest of the world commercially, or who will with equal cheerfulness produce warships and explosives as the temper of the time may demand. But, happily, manual training may also be used to serve power along its ideal, human side, and to do it still more effectively. When one goes about the business seriously, one may well feel appalled at the immense daring of trying to educate a boy, of trying to lead him from the restricted world of the primitive instincts into the larger world of the intelligent emotions. In the face of such a tremendous end as this all special schemes of culture must seem very partial and inadequate. Such an end cannot be gained by any poverty of means. The old rhetorical training could not compass it. The mediæval linguistic training could not compass it. Modern science teaching cannot do it. Physical culture is not the open sesame. Art and music do not hold the key. Neither can manual training alone bring about so great a result, and this is a point much to be borne in mind by those of us who are its ardent advocates. Education

is an inner process, a change of heart, a redemption of the spirit, a revelation. Whatever may be the ultimate nature of the world and of life, we know in our work-a-day world of appearance that the brain is the tool of the spirit; that upon the generosity and accuracy of its report of the outer world depends the material of the thought-life; that upon the soundness and free working of the tool depend the quality and the beauty of the fabric of life that we are daily weaving out of this material. The brain is the only part of the human organism that is provided with armor. Normally, it receives no direct impressions. It is incased, guarded, impenetrable. Besides the blood-currents that nourish it the brain has only six channels of communication with the outer world — the five organs of sense, of seeing, touching, hearing, smelling, and tasting; and the quite distinct psychic sense, which one may perhaps best describe as a sensibility to mental influence, a sensibility similar to that of iron in the neighborhood of a magnet, or of a closed conductor in a variable magnetic field. It may be that this psychic sensibility, like gravitation and all forms of radiant energy, is a phenomenon of the ether, but as yet we can affirm very little about it, and we are only beginning to speculate seriously upon the possibility of making it the subject of direct education. So much we do know, however, that the brain grows by what it feeds upon. Given a plentiful supply of good, rich, red blood, that is to say, perfect health and a wealth of sense-impression, especially a wealth of *quantitative* sense-impression, that is to say, well-trained senses, and we have the physical basis for a full intellectual life. Without this large quantitative knowledge and developed brain, we live in a world of illusions, a guess-world of very imperfect rationality. To cultivate the hand and eye and ear, even the nose and the tongue, is to enlarge the material of thought and to develop the tool of thought. If we could perceive the universe, we should perceive its essential moral and æsthetic nature. The highest work of education is to bring about this revelation. By using manual training, that is, quantitative handicraft, to develop the human organism, to give it power and judgment and perception, to bring out the sense of beauty and the impulse to generosity, to store up in its very tissue the polished truths of experience,— all this is to use power on its ideal, human side, and to lead a boy from the world of primitive instincts to the upland of the enlightened emotions.

To say that manual training stands at the parting of the ways would be a tidy expression, but it would hardly be quite the truth, for these two ways, the brutal way and the human way, represent the extremes,

and the real drama takes place on middle ground. The most out-and-out imperialist needs a heart to keep the blood pumping through his veins and has his moments of human tenderness and aspiration. The most thoroughgoing idealist recognizes daily want and knows that houses do not spring ready-made out of the ground, or gooseberry bushes grow roast beef and overcoats. The wholesome pressure of material want confronts us all. No present scheme of life can do away with human toil. But the significant thing in our practical handling of the problem is as to where we put the emphasis, whether we allow things to become themselves the end, or whether we make things minister to the spirit. Manual training may serve either ideal, the mechanical or the human, or it may serve any compromise between them. It has the same outlook as the social outlook of those who represent it. In the hands of small minds, it will be a mere apprentice movement, an adjunct of the shop and factory. In the hands of large minds, it will be in the deepest sense a culture-process, a psychological operation for increasing the social dimensions of mankind.

What is true at all is true in the extreme, and this method of passing at once to the extremes has the merit of making the middle ground more intelligible and of disclosing just where one stands oneself. It will be a long time, if ever, before we shall pass wholly over to either of these extremes, but it is a vital matter as to which tendency promises finally to get the upper hand. That the larger outlook will ultimately be realized I cannot for a moment doubt, and this not only because I am an optimist, by birth and subsequent experience, but also for less personal and more convincing reasons. In spite of our imperialism, in spite of our commercialism, in spite of our fondness for keeping away from the heart of things, there *are* deeper and more subtle currents at work in the national life; there are men and women who have passed to the higher level of social life and who are passing; there are those who are making the profound discovery that power, when used on its ideal, human side, yields infinitely the larger results. I do not at all mean that the immediate outlook is entirely encouraging. It is far from it. The friends of culture, the friends of power working on its ideal, human side, must be prepared for a long time to come to witness the triumphs of imperialism, of power working on its original brutal side, to witness them and not be discouraged. Evolution is a slow process. But one may well have patience, for it is also a persistent, irresistible process, and it has infinite time for its purposes. Moreover, it has you and me for its conscious and willing agents.

MANUAL TRAINING FOR THE ORDINARY HIGH SCHOOL.[1]

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TEN years ago manual training in the high school was an open question, and its desirability still a matter of debate. Now its cost is considered as legitimate an item of public expense as that of any of the traditional subjects. Some of the questions with regard to high-school manual training now are: What shall be taught? For how long a time? How freely shall it be offered (that is, in every school or only in special schools)? Shall it extend to the teaching of trades?

Not only on account of its value in general development is it highly desirable that all pupils should have manual training through the elementary grades, but, as long as the tendency to differentiate high schools prevails, it is also essential to bring all pupils in the elementary schools into contact with the greatest possible variety of activities, including that which manual training furnishes, so that by the time they are ready for the high school they may know in what direction their tastes lie. Otherwise the choice will depend upon proximity to the school, rather than upon tastes and aptitudes.

As the means of general development manual training should be one of the subjects offered in every high school. Experience proves that even classical pupils will gladly devote from two to four periods a week to this work in excess of the regular requirements. They are the better for it, physically as well as mentally. I have not attempted to say what modifications, if any, should be made in courses of well-equipped manual-training high schools, but only to show what may be done in an ordinary high school. The course here outlined assumes that the boys have already had bench-work in wood, and that the girls have taken sewing or cooking, or both, but have not had bench-work. This they are to take before they begin carving. The course occupies not to exceed four periods per week, and should be on the same basis as other unprepared subjects. Drawing is not mentioned, as it is presumed already to form an important part of the work of the school. It must, of course, precede every kind of work mentioned in the outline.

[1] Read before the Manual Training Department of the National Educational Association, at Charleston, S. C., July, 1900.

Printing, a subject not given in the outline, might well be included on account of its historical value, in addition to the manual element, as well as on account of its helpfulness in English.

The outline is not presented as ideal. There is no reason why other lines of work may not be substituted for some of those given. It merely sets forth a list that has been used successfully.

COURSE IN MANUAL TRAINING FOR THE ORDINARY HIGH SCHOOL

TIME, NOT TO EXCEED FOUR PERIODS PER WEEK

Year	Half	Boys	Girls
I	1[1]	Turning and pattern-making. Turning between two centers. Patterns requiring no lathe-work.	Bench-work. Similar to that in the grades.
I	2	Turning and pattern-making. Face-plate turning; chuck-turning and mandrel-turning. Patterns involving turned work.	Carving. Indenting and stamping, and groove-carving.
II	1	Molding in sand, modeling in clay, and casting in plaster.	Modeling in clay and casting plaster.
		Pattern-making. Cored patterns and other complex patterns of lathe.	Turning and carving. Turning between centers. Chip-carving and flat carving.
III	1	Relief-carving.	Relief-carving. Girls may not take up third-year work unless they have had bench-work.
IV	1[2]	Advanced turning and carving.	Advanced turning and carving.

The models made in the course in turning are afterward used in pattern-making. This saves much time. It saves an outlay of money for lathes and space for the pattern-makers. The pupils make patterns for a complete lathe. This involves all the elementary, as well as a number of the more difficult, principles of pattern-making.

In the course of carving no fixed set of models is used. The different kinds of carving are taken up in the following order: indenting and stamping, groove-carving, chip-carving, flat carving, low relief, high relief, and carving in the round. Each pupil makes his own design. Of course, he has some instruction and sees some examples. He then decides, first, what he will make; next, its size and shape; then, what parts are to be ornamented. Knowing the size of the space

[1] Only those who have taken I, 1, may take I, 2.

[2] Turning ornamental work and carving the same. Work of fourth year limited to those who have had a year's work in manual training.

to be ornamented, he proceeds to make the design, and later to work it out.

The casting in plaster is done by the boys by making molds in sand from patterns made in the pattern-making course, and by the girls from objects modeled in clay.

In high-school work there need hardly ever be two models alike. The course should depend, not upon models, but upon exercises. The pupil may make any model he chooses, provided it involves the exercise which we wish him to learn.

The idea is not entertained that such a course in manual training is equal to that given in manual-training high schools. It furnishes, however, an amount that will, together with other subjects studied, give a fairly well-balanced development. It does not include work in iron with machines. That may well be reserved for the separate manual-training high school. It cannot include chipping and filing, or forging, without giving more prominence to the subject than its importance, merely as a factor in general education, warrants. To do more would require more time than can be had in connection with a four-year high-school course which includes the ordinary subjects. The above amount is gladly taken in excess of regular work. Such work can be carried on in a school of 400 or 500 pupils with an equipment costing not to exceed $2,500. If a city has several high schools, the problem is simply one of repetition. If one of these is a manual-training high school, it may still continue to serve the purpose for which it was established by educating in a more strictly technical way those pupils whose tastes lie strongly in that direction. By eliminating those pupils not possessing special tastes in technical lines the manual-training high school would be able to advance its standard and reduce the time usually consumed in such schools by at least a year, thus saving the time of the pupil and giving him a more vigorous habit of work. The final or fourth year, possibly part of the third, might then be devoted to such work as is given in the early years of institutes of technology. Then any boy could, in his home city, fit himself to enter with advanced credits such an institution, or to enter at once upon a remunerative calling. At present we give him a broad foundation from which to specialize, but there we leave him. If he can get a chance to do just a little more for himself, his services will be in demand. I am in favor of this higher work, but the opportunity to take it should be based upon manifest aptitude.

From a social point of view the making of manual training the

exclusive function of one school, classical education of another, commercial education of another, etc., is open to criticism. It fosters the caste spirit. It is undemocratic. It trains up a generation divided into groups less capable than former generations of entering into sympathetic relations outside the group. It fosters in those not manually trained contempt for labor with the hands.

The girl who has learned the theory and practice of cooking and who can make her own garments will be a better woman, more sympathetic, more tolerant, because of such knowledge and skill. From a social standpoint all should have equal opportunity for manual training. The boy who studies Greek and who is going to college has as much need physiologically and psychologically of this training as has the boy who must early earn his own living, and society is equally concerned with both cases. Those not manually trained cannot appreciate the thought and skill that enter into the material things contributing to our comfort. On the frontier there are no class distinctions. It is possible to know one's neighbor. There the cowboy and the millionaire are not far apart. To know is to sympathize and to appreciate. The Rough Riders had not all the arts and graces of social circles, but they knew their leaders. Wood and Roosevelt knew and respected them, though in many particulars they had little in common. The nearer we get to the centers of population, the greater is the distance between man and man. It is greater in Chicago than in Denver, greater still in New York, still greater in the crowded cities of the Old World. When this barrier between rich and poor becomes high, the result is misunderstanding and suffering. When people give you up, you feel like giving up too. The rich lose as much as the poor. They lose the finer life of sympathy. Personal intercourse is at the foundation of all successful charity movements. There must be direct contact with problems before there can be any solution. The best architects have had carpenter's training. Physicians must know the work in the hospitals. Theological students are now sent to study the slums.

Present social conditions are aptly illustrated in the following paragraph from the pen of Edward Everett Hale:

> A strong and pathetic article in the London *Times*, some thirty years ago, represented a lady of high social rank from one of the fashionable squares at the West End of London, as she would appear at the day of judgment, as it is described in the gospel of Matthew. It depicted her as bravely replying to her Judge when he said: "Inasmuch as ye did it not to one of

the least of these, ye did it not to me." She said to him in reply that he was quite mistaken if he thought she had ever seen such people as he described. She explained to him that poor people, hungry and thirsty, strangers, naked or sick, did not live in the part of London she lived in. She explained to him that she neither walked nor drove in the region of the Seven Dials or Whitechapel. She told him that the police of London were quite too well regulated to permit such people to show themselves as beggars in Belgravia or Grosvenor square. And he was quite wrong, she said, if he thought she had refused to minister to them, for that the truth was she had never seen any of them and had had no such opportunity as he supposed.

The separation into classes has gone far. The public school should not encourage this separation. It should be a unifying force.

UNREALIZED POSSIBILITIES IN MANUAL TRAINING.

CLARENCE S. MOORE,
The Hill School, Pottstown, Pa.

ONE of our leaders of manual training in this country has said: "It is not enough to have fine principles in the superintendent's office and a workman in the sloyd room; we must have our highest principles among the shavings."

In a school in which I once taught, where type-form models had been used, I threw away dozens of models that the boys had made and left there because they did not want them. In a larger school, recently, five bushels of joints that had been carefully made by painstaking students were sent to the furnace because nobody wanted them. Of course one need not be surprised at this, because there is no use that a child can find for a joint. But other schools have greater sins. Sometimes one sees shelves covered with hundreds of pretty models that nobody wants, though they were made by loving and careful fingers and could once have given great delight in human lives; or in a dark closet will be a box overflowing with similar pretty things that never awakened looks of gratitude and pride and love from mother's eyes. To me such a closet is a tomb where lie buried precious human emotions that might have been and never were. Here is a tiny wooden chair that never gladdened the eyes of a little sick girl; here is a little table that was never held up by its eager maker for a loving mother's fond praise; here a pretty tray that never held pens on a father's desk to remind him that his boy is growing skillful. This is a dainty wheelbarrow, but no rosy, curly-headed boy ever ran with it to the aunt who is his playmate and champion, while his breathless haste and sparkling eyes give her far more pleasure than the wheelbarrow and make the pretty gift ten times more valuable. Do you want that little bracket? Take it. The time has passed when a grandmother might have put a vase of flowers on it with a blessing for the little girl who made it. On every hand are human loves that died before they were born; and the gray dust enshrouds them all, though they might have been clothed with the loveliest incidents of human life. They are too pretty to send to the furnace like the joints, and so they are kept to give to people who are interested in manual training.

But why were the models kept here? Why did not the children have them? They were kept for an exhibition at the close of school. The children may have them now, but very few come for them. Children do not live for yesterday or tomorrow, but for today. Last year's work is dead to them; and so we have this tomb. A superintendent's honest desire to interest the public in his schools, a teacher's pride in the course of models upon which he has spent years of thought, the trustees' wish that the people should see how well they have discharged their duties—such excellent motives prompt exhibitions; and yet the most excellent plans may work unforeseen evil. And the exhibition itself—do many people care for it? Not all the teachers certainly, and not an overwhelming proportion of the parents. I go from a half religious sense of duty, because I am a teacher. But everything is cut and dried, and it bores me. Visitors go, hat and parasol in hand, and, picking up a dove-tailed box, exclaim, "So this was all done with a knife!" or, if they have the pleasure of meeting the enthusiastic instructor, they are soon talked into a state of respectful helplessness and wonder. It seems impossible that any true idea of the work and its effect upon the children should be gained by this post-mortem examination of dry bones.

A child's interest in making things and his delight in what he has made are facts that give a teacher tremendous power over his activity. If you awaken these feelings and develop them, you can do what you like with him. Are you a workman or a graduate of a technical institution, with your head full of elementary principles and type-forms? You have only to present your abstract models to him in an attractive way, and he will seize upon them with such enthusiasm that you will know you have touched upon the right educational chord. Have you devised a perfect and carefully graded course? Try it on him, and you will meet with splendid success, even if you condemn him to four years of cramped knifework in the schoolroom. Do you think he should know how wood grows and how tools are made? He will industriously collect specimens of wood and carefully learn the construction and care of every tool. Whatever your aim may be, if you have tact, he will fall in with it for the sake of the fascinating shaving that curls out of his plane. In this state of affairs, one must not betray himself by thinking that a partial aim is sufficient. The highest aim alone includes all the others. If the aim be the full development of the child's spirit, and if the teacher be worthy, we shall secure the best muscular movements; the best intellectual processes; the most helpful

instructions about tools, processes, and materials; the most intimate coöperation with the school life, play life, and home life of the child; and the whole range of emotional possibilities. The child is delighted to use tools, and we can use his delight to entrap him. Shall we make him work on our course and attract interest to our exhibition, or shall we arrange a meeting between childhood and the Infinite and stand reverently aside with our petty apparatus? There are mighty possibilities to be developed in these little souls. There are judgment, skill, inventiveness, accuracy, generosity, self-respect, self-reliance, love, and the power to build homes. It is of these that we must think and not of our educational machinery. A builder must have good scaffolding, but if he neglects his work to decorate and perpetuate his scaffolding, he is a bad builder. Manual training is needed in the schools, we hear. I say the world needs love. It is only a passing thought now and then in the little worker's mind that what he is making will be used by someone he loves. Yet it is for this passing thought that we must work. When it comes we do not know, how deep it is we cannot learn; but for this we must erect all our scaffolding. Human life has no happier moment than that which a man knows when a dearly loved one acknowledges the work that he has done for her. It is the glory of manual training that it can secure this happiness to the boys and girls. To keep models for an exhibition utterly destroys this possibility. Sending them home at the instant of completion makes possible the development of the noblest attachments.

Let us start again. Let us have neither an exhibition nor a course of models as an aim — not even as a secondary aim — only today's child and his development. We will have a course because, in teaching, we must begin with simple things and advance to complex ones; but let us have a course rich in opportunity for choice and invention, and let us never regard it as fixed. We will send each model home while it is hot, because the supreme moment in human life is when our work of devotion is accepted. This is true of human beings from babyhood to old age, and neither life nor manual training has any greater gift to offer than the opportunity to devote our work to those we love most dearly. I repeat this; is it not worth repeating many times? In some schools the children are told that they cannot have their models because the tools and material belong to the school. Is not this a chance for the nobler lesson which nature has taught our race; that the truest ownership is founded upon individual exertion? And we will have exhibitions too, twenty or thirty a year in every house where

children are loved. Nor will the exhibitor be Professor Windbag with his tiresome panels, but Alfred and Mabel with their dancing eyes and rosy lips. And the visitors will not listen, half bored and half respectful, but will catch some of the delight that the children feel. But shall we have no June exhibition? Of course we shall. Not one of dry bones and dead loves, however, but one of human life and incident. We will ask the children to bring back all their models that are not lost or given away and to lend them to us, all the dirty and broken ones, and we shall learn by their appearance how much they have entered into the fabric that mysteriously binds human hearts together and builds up human institutions. A complete set returned as clean and perfect as when taken away may mean childish selfishness or a collecting instinct, or perhaps a parent's pride in saving the work, and a few questions might discover which it is. Different degrees of wear or dirt might show different degrees of usefulness. A model, either uniformly lost or never used, would show a model that ought to be left out of the course, because it has no place in human life. By such an exhibition we could learn the real value of our scaffolding, and what lines should be followed in changing it to meet the needs of our work. Does it not seem that, if we followed such lines, manual training, already a great power, would soon become a far greater power for the development of children?

THE RELATION OF NATURE DRAWING TO STRUCTURAL DESIGN

James Hall,
Director of Drawing, Springfield, Mass.

"To say to the painter that nature is to be taken as she is, is to say to the player that he may sit on the piano. . . . . Nature is very rarely right." Thus forcibly does Mr. Whistler put one of the fundamental principles of art.

If it is true that the painter cannot find his pictures ready-made in the landscape before him, surely the designer of ornament should not look to nature expecting to find designs ready for his use. Then what shall we say of the architect, considering architecture as inclusive of all structural design? Where does she show him the proportion of his façade? Where can he learn from her how to fashion a table or a chair? To him nature alone can carry no message. Where in nature shall the potter learn of the designing of vases, or the iron-worker of the forms suited to his craft?

Nature unaided never plays the part of art instructor. Her treasure-house must be unlocked with the keys of art before she will assist us to learn design. But if we go to nature knowing art, we find in her a sympathetic teacher, an inspirer, a whisperer of suggestions of beauty without limit, a discourager of the commonplace, a stimulator of originality. But go to her without art's introduction, and she will either show you nothing or lead you all astray.

In all structural design it would seem to be an axiom that the first considerations must always be: suiting the form of an object to its use, and employing the material used in constructing the object according to the material's possibilities and limitations. In modern days both these prime considerations are often unheeded. No designer who is not thoroughly conversant with all the details of the craft for which he makes designs can ever hope to do good work.

We like to think of the artist-craftsman of the Middle Ages — the workers in wood and the workers in iron. As the blacksmith 'prentice year by year gained skill in all the secrets of forge and anvil, at last he made the iron to blossom forth into beauty; he became the artist in iron like his master.

But now, where can we find as teachers for our manual-training schools the artist-craftsmen? Is it not true that conditions are so far changed in our days that the thorough workman in wood or metal is seldom an artist? And so we have to find teachers of craft and teachers of art. The teacher of art in the manual-training school must at least, then, do his best to get at an understanding of the crafts. The closer his relations with those who teach the processes, the better for all. In our present movement for "art and craft" we must knit interests together. The art spirit must be all-present in the school of manual training. Interest in the crafts must at all times be with and guide the teacher of art.

If anywhere, it is in the manual-training schools that we can, at least in part, revive the artist-craftsman spirit of the older times.

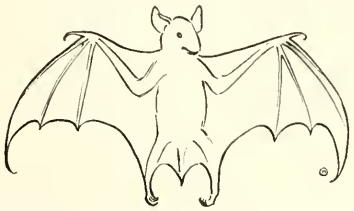
A freehand drawing course in a manual-training school should work toward two ends. First, it should be disciplinary — it should train in graphic expression, free, accurate, and graceful. Pupils should learn to represent objects in pictorial form adequately, correctly, beautifully. The value of this side of freehand drawing is largely recognized even by the most prosaic advocates of things "practical." The other end which should be sought is teaching the principles and practice of design — of art.

Mr. Arthur W. Dow has done much toward bringing about a correct point of view in this matter of art, demonstrating in his teaching the fact that art expression concerns itself primarily with the arrangement of lines and masses in agreeable relations with each other.

Dr. Denman Ross, of Cambridge, is having wide influence in bringing about clear instruction in the principles of pure design. He finds that these principles can best be taught by applying them to the arrangement of meaningless spots. As taught by Dr. Ross, there are three fundamental principles of design: rhythm, or consistency of movement; balance, giving rest; and harmony, a suitable and just adaptation of parts to each other, a well-proportioned arrangement of

elements into a consistent and pleasing whole. If pupils have been taught these principles, then will they find them exemplified in all nature, and so will nature study come to have artistic significance.

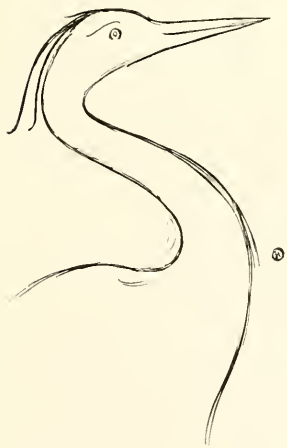
Simply as discipline the intelligent drawing of nature's outlines has its value, but we are doing far more when we lead the pupils to draw natural forms that they may study rhythmic growth, balanced relations of parts, and fine proportions of parts to whole and to each other.



Study of this kind cannot fail to cultivate an appreciation of the finer qualities of design, for the best designers catch and put into their creations the vital spirit of nature. A fine cathedral seems to *live!* The best furniture is so fashioned that its solidity does not rob it of the appearance of elasticity, and wrought iron without springing growing lines is stupid to look upon. The study of pure design—of design in the abstract—must be vivified by nature study.

For such study some forms are especially good, and it is my purpose to here suggest a few.

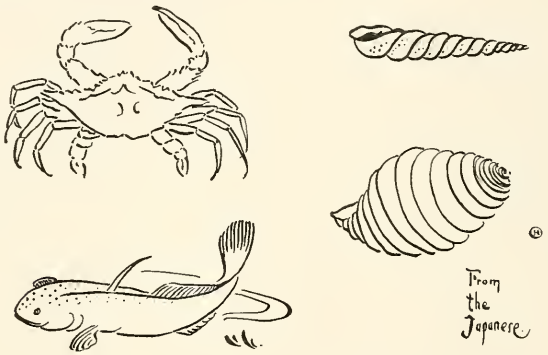
If we look to the plants and flowers to study beautiful curvature, rhythmic growth, balance without exact repetition, and a variety of size and shape in the parts which make up a harmonious whole, we shall find that the weeds by the wayside are no less fine as designs than the rare exotics from the hothouse.



What an inspiration is the dandelion in all its parts! If we examine a leaf, how exquisite are its curves—"immortal" curves—of far more noble birth than any bred of compass. How various these curves! How well related! What well-ordered variety in the lengths of points and in the distances between them! Now, hold the leaf off a bit and see it as a whole. How perfectly the two sides balance, and yet there is no

part like another. But each detail is so related that with richest variety we yet have oneness. Every part seems just what and where it should be. That side view of what was once the flower again shows us that nature works according to the principles of design, and gives us another beautiful form.

The Japanese artists, of all others, feel the decorative essentials in all that they draw, and hence pupils can learn of nature, and of art too, by copying their drawings. The shells show finely graded space relations, which should suggest a lesson to the designer of the various



forms to be turned. Too often we see in manual-training schools exercises in wood-turning showing artless monotony of spacing, and testifying to the barrenness of imagination of those responsible for them.

The bat and bird are so full of decorative lines that it seems unnecessary to analyze them.

To a skilled designer the form of the bat might furnish a motive for an escutcheon; or the dandelion flower, with proper modification, might be made into a form suited to a candelabrum. The value of nature study for the pupils, however, is not that it gives explicit motives for this form or for that, which they may be called upon to design. Rather an education of the decorative judgment and feeling should be sought. The pupils should see the natural exemplifications of the great principles of all creation. Then are they better able to solve a problem in structural design, not only in accordance with common-sense, providing for strength, commodity, practical fitness, but also adding the thought and feeling needed to design a thing of beauty.

LIBRARY HANDICRAFT AT GREELEY, COLO.

JOSEPH F. DANIELS,
Librarian, State Normal School.

IN a library there is a great deal of wear and tear, and it is well to keep books in good repair by the stitch-in-time method. It requires some laboratory work not as elaborate as that done a bindery, and it demands a little time.

After four years of pasting and stitching and binding, we found that we had covered some ground, had accumulated tools, and a trifle of knowledge of the subject; so, with simple faith, we offered a course in library handicraft (and library science) in a rather indefinite announcement in the catalogue. The laboratory was to occupy about ninety minutes a week on the program. The course was made to conform (1) to the ability, life, and environment of the student; (2) to his pleasure in the work, as manifested in finish or in ornament, in conversation or in other personal actions; (3) to conditions over which we had no control, such as the time schedule, the curriculum of the school, and inadequate equipment; and (4) to my point of view.

There were twenty-five students for whom we had to provide, and we bought three sewing benches, three finishing presses, three sets of backing-boards, one good skiving knife, knives and rules for the class, a Gaylord mat-cutter, binder's sundries, paper stock, leather, cloth, and such materials, to the extent of about $50.

From the beginning we avoided the idea of the "model" as given in sloyd or other manual-training school courses, and to impress this condition I offered the very first class-work for sale. The first thing made was a portfolio, which was placed on the market at an advance on the cost of the materials and a margin for labor. It was quickly sold out to the senior class in the history of art, and netted about $30, with which we purchased leather and boards for a better portfolio, which became the property of the maker and left the class somewhat ahead in the transaction. We then made our tool-boxes, our record-boxes, and our notebooks; and throughout the course, when we needed anything, we made it when we could do so.

We had been warned by the dealers in paper stock that prices were to go up, and the trade journals seemed to think likewise; so we held

class council and took advantage of the rising market in immediate purchases. In this democratic way I hoped to make the students who were to go out in the world to teach somewhat self-reliant and acquainted with responsibility. I have heard so much about stubborn school boards who will do nothing for the teachers, that I thought it best to make teachers able to do a little without the aid of such persons. Most teachers confine themselves to tuition and are helpless in a schoolroom, unless there be a mechanic near at hand for the simplest repairs or odd jobs. I do not presume to discuss the duties of the hired teacher in this paper; I am writing of another thing. I will say in passing that I think that a teacher is legally bound to do almost nothing in a schoolroom beyond recitation work and (in the country) building the fires and sweeping out, and that a great many of them are lawyers enough to hug their rights with more effort than they put into anything else in their lives.

When we went into the portfolio business, a perplexing question arose: there were about ninety students in the school who wanted portfolios, and there was neither time nor inclination to begin a manufactory in the school. I gave permission to the members of the class to make portfolios when convenient, subject to inspection; but still we did not have enough to go around. Then we agreed to teach as many as wished the secret of making good portfolios—"better than you buy in the shops." The demand seemed satisfied, and all sorts of portfolios came into vogue like Easter bonnets.

The mounting of pictures *à la passepartout*, flat, hinged, with bevel mat, and in other styles, crept over the school after the portfolio, and our laboratory soon became the resort of the amateur craftsman who wished to bind a set of Kipling in limp or to repair a family heirloom.

The ninety minutes a week were faithfully given to the class by the instructor; but the question, "Who left the cover off the glue pot?" would surely disclose the fact that some student or member of the faculty had been doing something in the laboratory out of class hours, and soon it had to be open every day and all day long.

In applied design we had much grief. None of the students knew the grammar of ornament even by name, none had done drawing before, and the board and T-square were strange, unknown things. We had begun with freehand working drawings and sketches of everything made. Such work was done in the notebooks, which were diaries more than books for the taking of notes. In this way some of the rough places in freehand had been made smooth; but with the

introduction of ornament, and in color, there was trouble — almost a stampede. We crawled through title-pages, head and tail pieces and borders. A few students liked color and did some original work on book-marks and book-jackets; but for the most part they were glad to get through the work in design in the most perfunctory manner. This was a disappointment to me, for I am very fond of the work in color, and I thought myself better prepared for the teaching of design than of any other part of the course.

The skiving knife brought out the best work of the hand, and but few in the class could use the tool to any purpose, although each attempted a slip-case for note-pads. The case was made in green calf, with slightly rounded corners; a very sharp knife and a steady hand were the only things necessary. We all found that much practice is required to produce good work with the skiving knife. At this point in the work I showed some clever bindings, in which the leather was peeled to the thinness of tissue. This set them all at it again, and there was some improvement in the work; but no salable or passable work seemed possible with the skiving knife. All of the slip-cases were poor, and some of them were sliced and cut into rags before they were ready for the glue pot. We are too far from the best examples of workmanship, and we do not know all of the possibilities of the idea of library handicraft; but we have been at work and ought, slowly, to do better.

SEWING BENCH.

Books too badly worn for ordinary repair are re-sewed (whipstich — one on) on tapes as shown. A cloth reinforcement is overstitched at first and last sections. About one volume of this work is required of each student.

The question of method has been the great problem of the year, and in the face of comment I have to say that I think that there is something wrong with manual training in this land. Our schools are

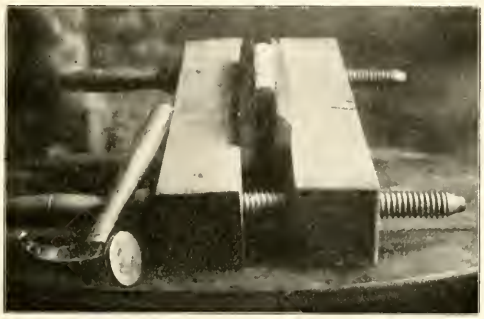
too big, or the instructors are too big with having been to Germany too long or too often, or in some way too much institutional work is done for the moral good of the pupil. If I could tell you just where the trouble lies, I should do so and win fame in the bargain. This I do know: that children should own their schools in some sort of fee, and they should be made to understand it. I said that some teachers go to Germany. There is nothing wrong in that; it is positively good for a man to go to Germany or anywhere with an honest desire for the good things to be had in education. It cures arrested development and ought to broaden a man's mind. But I refer to a desire on the part of many instructors and directors to go through with all the ceremonials up to the thirty-third degree, in a perfunctory way, in order that they may be absolved of further educational work except as it is thrust on them in meetings and *gabfests*.

It is not my purpose to give our course in detail, but rather to insist that such a course is desirable in normal schools, and to encourage those librarians who wish to expand their sphere of usefulness.

In the matter of pedagogy it is, perhaps, better to go ahead with some intention, good or bad; with some direction, right or wrong, than to dally with diverse interests and to stand at educational cross-roads reading sign-boards; for often one cannot read the mass of painted and repainted words, one over the other. For better or worse, we went ahead to do something with the little knowledge and light at command. When we began library handicraft in this school, I felt that an educational foundation built of interest, attention, point of contact, method of the recitation, culture epochs, localization of the cerebral functions, and other known and unknown pedagogical building stone discovered and to be discovered, might insure success, whatever the subject-matter; but I was not sure that I could identify the blocks or "bed and build" them. Then my point of view was needed in the course, as I have indicated at the beginning of this article.

The point of view needs some explanation and will probably account for the fact that a librarian attempted anything beyond library science. My father was a mechanic, and after college I was apprenticed to an architect at nothing a week. For this man and the whole office I ran errands, ground ink, kept things tidy, and, if good, I was allowed to do a little tracing, or to study projections, or Trautwine, in order to improve my mind and to be out of the way. My first thoughtful acquaintance with school matters came with a new apprentice, a graduate of a school of technology. I shall not name the school, but

this occurred far east of Chicago. The young man made a detail drawing of a bath tub with copper a quarter of an inch thick (copper was good for tubs in those days). He told me that he had never seen a bath-tub construction, and I soon learned that he had seen very little of any real workmanship; so when we came to the detail of the drip on a heavy stone cornice, I was not surprised to find that the drip was left out. He was a good boy, though, and soon outgrew his unfortunate handicap. He grew to be a man and an architect, but it was a close shave. From him and others not unlike him I learned that education is like religion: it is either practical or useless in business.



FINISHING PRESS AND BACKING BOARDS.

After the book is taken from the sewing bench and "rounded" it is placed in the finishing press for "backing." Glue, super-headbands, and paper are then laid on the exposed back, and, after drying, the book is ready for its case, either cloth or leather. The binder's hammer with its peculiar pean is shown in the illustration.

Soon after my office experience I was "called" to teach, and found that I was no stronger than others who hope to do great things; but I got help from other schools and from factories and from workingmen, and I began to learn. Then I discovered that there is a science of education, and I thought that I had the key to the whole situation — but the key didn't fit. Some there are who have keys — pretty trinkets for watch-fob wear — with which they are so well pleased that they seek to convince us that the fault is in the keyhole, and they would have the whole thing adjusted to fit the key. Just as old Omar sighs, they would remold it nearer to the heart's desire. I had worked very hard for years in the manual-training schools, resident and absent treatment, and yet the key would not fit. I had had charge of a school and several instructors, who believed that the good God would take care of his own and bring us out all right, if we but read the *credo* regularly and observed the doctrine and the rites. We did all of these things and added the sacrifices, and we had a pretty good school too, but we never found the key. Without argument, I hold that the keys

need filing or should be made from new blanks. All but the key-holders seem to think that the key is to be found later in the history of education. I do not know, and, with all your wise looks and clever words, I suspect that you do not know.

That is my point of view and a brief of the training which persuades me. It is not strange that in this library handicraft I resolved to make it all very practical to the point of commercialism, and that market values as tests of workmanship played some part up to the point of manufacturing.

Since we began the work in Greeley, we have had a number of persons, school-teachers and others, apply for instruction in applied design, illuminating, the making of portfolios, binding of books, and the making of a few trinkets for the drawing-room; but we have been too busy with the library to go beyond the school, and we shall have to give over the work altogether, unless assistance is given the librarian. I believe that the work could be established in independence, with a little courage and grit, and that it would succeed. I think that it is especially useful in a normal school, because so many teachers need such training for actual, practical schoolroom use.

In addition to the course as described we had desk and record work, talks on books, and library matters which made up a small taste of library science. I have little faith in "talks" as I have heard and have given them; they are pedantic and have none of the lively interest which attaches to conversation in a small laboratory. They are wasters of good time, and, like so many things in our great system of education, they assist in that process of extracting the backbone from the student.

The difficulty to overcome in the introduction of library handicraft is the condition of most normal-school libraries. The librarian is usually overworked in the larger libraries, and occupies a place on the faculty by courtesy only; or the incumbent is incompetent in many of the smaller libraries, because anybody can

do the work, and there is no demand for a better library. The salary paid librarians is very small, and is always less than that paid to the faculty of the school. This poverty restricts the opportunities of the librarian, and the work resolves itself to sweeping the work into a corner to the accompaniment of that cheerful ditty:

Come day, go day;
God send pay day.

Alack! It is the slave blood that gets into us from drudgery, and the need of a sustaining philosophy, that hinders all work; and there is too much of the curse in Deuteronomy: "In the morning thou shalt say, Would God it were even! and at even thou shalt say, Would God it were morning!"

The name "library handicraft" is used to designate this work, because it is an adjunct to the library and a great deal of the incentive is found in the library. It is centered about the library, and, with any other human interest as a center, might preserve the distinctive features of this course. It is the intention to avoid the same course for two years in succession, and to get at the keynote of every class in the work planned.

AN OUTLINE OF TEN LECTURES ON FORESTRY, LUMBERING, AND WOOD.

JOHN C. MILLER,
English High and Manual Training School, Chicago.

THE outline given below is one prepared for use in the English High and Manual Training School of Chicago. In the first year's work a series of ten lectures is given to the students on the materials used in that year, each lecture being illustrated by the lantern and slides dealing with every division of the subject. Notes and sketches are taken by students, and an examination is given upon them at the end of the term. By this means we believe that the education of our students is broadened and carried beyond the limits of that of some manual-training schools. No other notes than those given in this outline are found necessary in delivering the lectures when the headings given are accompanied by proper slides.

FORESTRY, LUMBER, WOOD.

LECTURE I.

Forestry.

- Meaning of the term.
- Colleges having courses in.
- Associations devoted to.
- In foreign nations; results.
- Results in the United States, with examples.

United States Department of Forestry.

Forests.

- Preservation.
- Effect on climate, rainfall.
- Propagation as an investment.
- Rate of growth.
- Time and age of cutting.
- Length of life.
- Pruning for lumber.
- Forest covers, wind breaks.

LECTURE II.

Trees.

- Classes — exogen, endogen.
- Structure — stem, root, leaf.

Stems.

The cell — annual rings, medullary rays.
Canals.
Sap.
Bark.
Sap-wood.
Heart-wood.
Pith.

Root.

Tap roots.
Root hairs.
Transplanting.
Office of.

Leaf.

Structure.
Stomata.
Cells.
Chlorophyll.
Changes in.

LECTURE III.

Circulation.

Cause of.
Means of.
Sources of sap.
Transformations taking place in.

Growth.

How trees grow.
Food materials.
Conditions of soil, light, moisture.
Growth in height, thickness, branching.
Rate of; cubic feet per acre value.

Composition.

Water — free, combined.
Elementary.
Carbon.
Soda.
Potash.

LECTURE IV.

Propagation and reproduction.

Seeding.
Cuttings.
Processes of grafting and budding.
Transplanting.

Care of the tree.

Covers and breaks.

LECTURE V.

Lumbering.

A lumber camp.
Cutting with axes — wasteful; saws — advantages.
Season for cutting.
Log marks.
Transportation to mill — ox teams, log trains, railroads, rafting, conveyors.

Rafting.

A log drive.
A jam.
Booms.
Lost logs.

LECTURE VI.

Sawmills.

Water wheels — old and new.
Overshot and turbine.
Saws — pit, circular, inserted tooth, band, gang, resaw.

Lumber grading.

Timber, plank, boards,
Specifications.
Defects.
Widths.
Color.
Grain.

Lumber measuring.

Board rule.
Steel square.
Calipers.

LECTURE VII.

Seasoning.

Weight reduced.
Saves transportation charges.
Durability increased.
Loss in firing wet wood.
Increases stiffness.
Tests.
The drying kiln.

Warping.

Why and how.
To prevent.
Remedy for warped boards, etc.
Structural defects tending toward.

Shrinkage.

Quarter and bastard-cut shrinkage.
Longitudinal.

Effect in structures.
To prevent.
Must be considered in all design.

LECTURE VIII.

Properties.
Durability.
Porosity — hardness.
Elasticity — stiffness.
Brittleness.
Density — weight.
Grain — straight, cross, curly, birdseye, quarter-sawn.

Varieties of common woods.
Peculiarities of each.
Appearance of leaf, stem, wood.
Adaptation of each to various uses.

LECTURE IX.

Defects in lumber — causes and preventives.
Resin pockets.
Knots — tight and loose.
Shakes and wanes.
Bastard cuts.
Wind checks.

LECTURE X.

Decay and its causes.
Moisture.
Insects.
Ventilation.

Preservation.
Oiling.
Painting.
Varnish.
Chemical treatment.
Impregnation.

LEAF-FORMS OF OUR COMMON BROAD-LEAVED TREES. III.

EDWIN W. FOSTER,
Manual Training High School, Brooklyn, N. Y.

IT is the maple family to which we are indebted for the glorious coloring of our autumn landscapes, and all true lovers of nature will acknowledge the indebtedness to be a large one. It is true that all trees play their part in the general color scheme, but for the brilliant

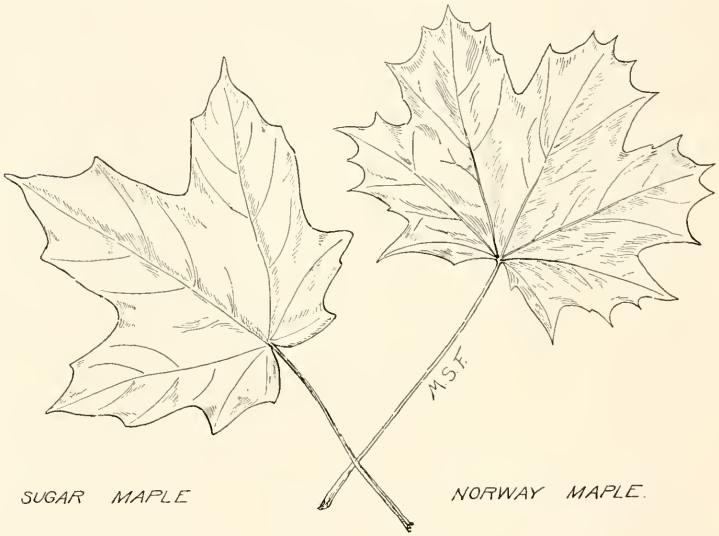


FIG 1

reds, scarlets, and vermillions of the fall foliage we must look to the maples. In this connection it is interesting to note that, although the years may differ in the relative brilliancy of their fall colors, the individual trees turn practically the same hues every year, that of two maples of the same kind standing side by side differing materially, and even individual branches on the same tree being in marked contrast; yet each recurring season those particular branches will take on the same relative colors.

The teacher, on taking up this subject for the first time, may be surprised to find that students often know of only one maple, and that, naturally, the sugar maple. It is wise, then, to take this as a starting-point. Describe the process of making maple syrup and sugar, explaining the method of tapping, the handling of the sap in buckets, the camp with its vats and pans, and the boiling process.

As so large a proportion of our people today live in cities, this old process and the happy times which accompanied it are completely

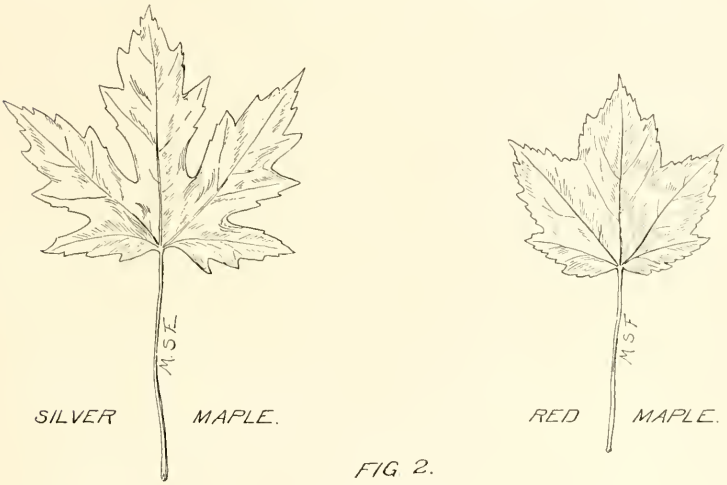


FIG. 2.

unknown to the majority of children. They will be interested to know whether the tree is killed by this treatment, and also in the quantity of sugar produced. A gallon of sap produces three ounces of sugar, and as few trees yield more than thirty gallons of sap, the average production of sugar per tree is about five and a half pounds, and sometimes even less. The size of these maple groves may be judged from the fact that one farm alone in New York state produces five thousand pounds of maple sugar a season.

This leads up to the consideration of the tree itself, which, like all broad-leaved trees, has a leaf with characteristics which identify it at once.

In fig. 1 are shown side by side the leaf of the sugar maple and that leaf which is most likely to be confounded with it, *i. e.*, the Norway maple.

During the summer the color of these two leaves is practically the same, and as they are of the same size and general shape, they must be examined critically in order to distinguish them. There are perhaps no two leaves so nearly alike in the forest, except the pin and scarlet oaks. It will be noticed that the points of the sugar maple are blunt, decidedly rounded, and fewer in number than of the Norway, which has sharp points. There is also a considerable difference in the texture of these two leaves, that of the sugar maple being thicker and coarser than the delicate thin leaf of the Norway. The general habits of the trees furnish the final difference, the sugar maple growing much taller and less compact than the Norway, which is planted for the very reason that, although a low-growing tree, it gives the densest shade of any of the deciduous trees.

SYCAMORE MAPLE.
FIG. 3.

STRIPED MAPLE. MOOSEWOOD.
FIG. 4.

Edith Thomas has said:

South America possesses the milk tree, India the bread tree, but it is reserved as a sort of climatic paradox for our temperate north to furnish the very top of luxury in the shape of the sugar tree. A man who could persuade these three staple producers to grow on his plantation could henceforth live independent of the milkman, the baker, and the grocer. It would be very easy work to gather the yield of the two tropical trees, but the sweet of the maple would still have to be gained by the sweat of the brow.

As the lover of trees surveys the list of maples, he cannot help but express his admiration and enthusiasm. The one which naturally

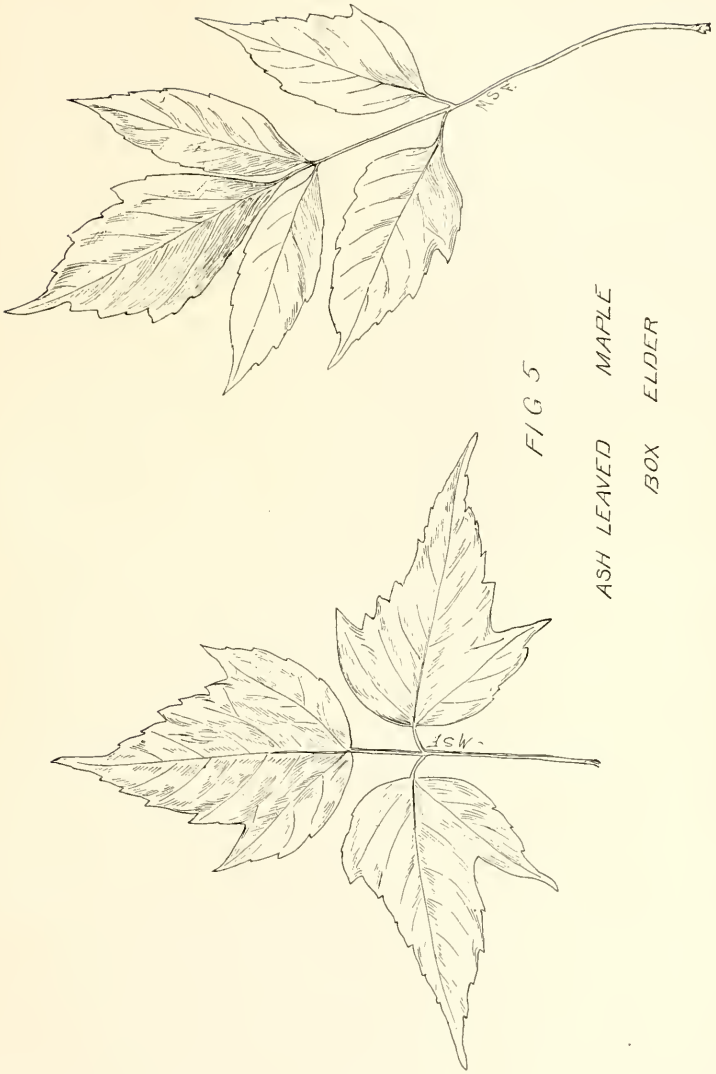


FIG 5

ASH LEAVED MAPLE

BOX ELDER

comes next in the list is the silver, soft, or white maple, as it is variously termed. From the ground up to the topmost leaf the whole character of this tree suggests the word "thoroughbred." Clean-cut, refined, strong, and healthy in every detail, the silver maple, under conditions at all favorable, is a thing of beauty and might truly be called the acme of perfection in tree life. Its name is derived from the fact that the under side of the leaf is silvery white. The upper side, being dark green, gives a beautiful effect when the wind stirs the foliage, which, as a whole, has the grace, and often the drooping effect, of the American elm.

The above conditions are not always realized, however, as it is planted extensively in the cities, where horses gnaw the fine bark, smoke and soot discolor the leaves, and the caterpillars complete the work of destroying its beauty; yet it still lives, because it has great vitality and exists, even if it does not thrive, under such demoralizing conditions.

A relative of the silver maple, and one which might be mistaken for it by the superficial observer, is the red, swamp, or wild maple. It is this tree which displays the brightest reds and from which it takes its name. Referring to the sketch, it will be seen that the leaf is smaller, and three-fingered instead of five-fingered, as in the silver variety. The stem of this leaf is also red during the entire season, as if it could not wait for autumn. Thoreau, in expressing his enthusiasm over this tree, says: "Its virtues, not its sins, are as scarlet."

In the rows of maples, so common in our towns and cities — outside of New England — one will often find a leaf larger, heavier, and coarser than any of the other maples. This variety, like the Norway, is an importation from Europe, known as the sycamore maple, the name being derived from its resemblance in size and form to the sycamore leaf. It is easily identified by its large size, coarseness, the very long, thick red stem, and by the fact that its entire edge is finely toothed, in which point it differs from all the foregoing varieties. Its value as a hardy shade tree is nearly equal to the Norway, and in Europe it is frequently planted to the exclusion of other maples.

Growing in the shade of other trees, and forming considerable of the undergrowth of the woods of lower Canada and New England, is a small tree known as the striped maple, from the vertical stripes which mark its trunk. The New England name for this mountain tree is moosewood, from the fact that the bark and small branches are the favorite food of the moose. The leaves are larger, or rather have the

appearance of being larger, than our other maples, from the fact that the indentations are slighter than is usual in maple leaves. This leaf is also of a very soft and delicate texture, which the moose evidently appreciates along with the saccharine nature of the young shoots and buds.

One of the most annoying things to the amateur tree fancier is the intrusion of hybrids or fancy varieties into the blooded stock, so to speak, of standard trees. These mongrels, often very interesting and meritorious, are sometimes the result of the nurserymen's skill, and at other times are wild seedlings. The best motto to adopt in case of a discovery of this kind is "by their fruits ye shall know them." For instance, we find during one of our trips to the park or woods an odd compound leaf slightly resembling the ash. Yet it is a maple, because its fruit consists of clusters of unmistakable maple "keys" or seeds. By similar means one would decide that a tree with willow-like leaves, but bearing acorns, was the willow-oak, etc.

JAPAN MAPLES.
FIG 6.

This ash-leaved maple — or box elder, as it is called — is interesting, not only because it is our only maple having compound leaves, but because the forms of the latter vary so greatly. The two sketches shown give a good idea of the wide range of form and the peculiar characteristics.

North America possesses only nine species of maple, and it is said China and Japan have more than thirty. Indeed, it is to the latter country, whose forests are largely made up of maples, that we are

FIG. 7.

JAPAN MAPLES.

indebted for some of the most dainty and exquisite trees to be found. The Japan maples which are planted so extensively on our lawns and in our parks exhibit such a variety of form and wealth of color that no written description can do them justice. Figs. 6 and 7 will give some

idea of their delicacy. The colors, which, of course, cannot be shown, range from dark purple to the most delicate combinations of white and green. The finest of these dainty leaves bears a stronger resemblance to the ostrich feather than to anything in the line of tree leaves.

ASSOCIATIONS.

CONNECTICUT STATE TEACHERS' ASSOCIATION.

The fifty-fourth annual convention of the Connecticut State Teachers' Association was held in New Haven, October 19, and was attended by a large number of teachers from all parts of the state. The program was one of unusual richness and breadth, and included many speakers from outside the state. The convention was divided into seven sections, each occupying a different building. The leading speaker in the kindergarten section was Dr. Luther H. Gulick, of Pratt Institute, Brooklyn, who read a paper on the "Development of the Motor Centers." In the primary section Dr. Edward R. Shaw, of New York University, read a paper on "The Interrelation of Subjects of Study," and Superintendent John F. Reigart, of the New York Ethical Culture Schools, one on "Correlation of Handwork with Other Subjects of the Primary Grades." In the high-school section "The High School or Academy, Which?" was discussed by Principal H. P. Warren, of the Albany Academy, and "Shall the High-School Teacher Study Pedagogy?" by Charles S. Chapin, of Westfield, Mass. Dr. Nicholas Murray Butler, of Columbia University, spoke to a large audience in the grammar-school section on "Some Evidences of an Education." He summed up his address by saying that the essentials to a good education were good speaking, good breeding, reflection, efficiency, and power of growth. Before the same section Harris W. Moore, of Hartford, read a paper on

MANUAL TRAINING FOR GRAMMAR SCHOOLS.

Mr. Moore called attention to the need of manual training in the grammar grades, and pointed to the fact that the growth of manual training in these grades has been marked during the past few months in several sections of the country. He spoke of certain guiding principles in this work, of its value, and then of methods and means. The following paragraphs are quoted:

"What moral benefit the child has derived from the fact that he has been working in a medium that permits of no ambiguity! He has been able to test his work at each stage, and he knows that no words will cover up an untruth worked out in wood.

"The fostering of his interest in the home life also, and his ability to contribute thereto, is eminently worth while, for in our American life are there not already too many grave factors working against the home instinct, and do we not need to cultivate it by every proper means?

"The child's own interests should be consulted in the arrangement of every course, for it is from the standpoint of what is worth while to him that we get our strongest hold upon his development. I feel that there is a large field of opportunity for manual training, as yet hardly entered upon, in the problem of toys for children. How it intensifies the interest of the child if he knows the model he is making will 'go' when he finishes it! But, alas, oftentimes this interest is so predominant that we cannot get him to spend time enough to do good work. To secure the best workmanship there should be a constant interest in the process by which ends are

achieved, and this interest can generally be developed by calling the pupil's attention to the most expeditious way of attaining the end; thus he will come to pay more attention to the quality of his work.

"In the selection of models and courses best adapted to the different grades the laws of physical development will guide us. Normal development proceeds from the trunk outwardly, through the larger muscles and groups of muscles to those which are more accessory. It is only the mature body which is capable of the finest adjustments of those marvelous muscles of the hand. And because this is a fundamental law, I wish here to advocate a more extensive use of the drawshave in manual-training courses. As I think of my boyhood and the tools I chose to use, I can testify to the large place which the drawshave occupied in all the work I did. Seldom did I care to dress off a piece of wood with a plane, but I was most eager to shape it with a drawshave into a boat, windmill, or whatnot. Being on a farm, of course I had plenty of material and no instruction, save my own experience. Perhaps it is economy in the use of stock which has prevented an extensive use of the drawshave in manual-training schools, for the models suited to this tool are necessarily quite large; but the fact remains that the bodily movements required in its use are among the most hygienic."

THE END OF EDUCATION.

In the evening President William DeWitt Hyde, of Bowdoin College, addressed the convention in the United Church. His subject was "The End of Education," and was, in part, as follows:

"The end of education is to know and get what is best in the world, and to give our best work in exchange.

"The four stages of education are elementary, secondary, higher, and professional. The end of education is not something which is to be attained only at the conclusion of the fourth stage. It is something which can be attained to a certain degree at the end of each stage, and may be attained more completely at the end of the first or second than it often is at the end of the third or fourth. There are many bachelors of arts and doctors of philosophy who, tested by our definition, are much farther from the end of education than many a graduate of the district or grammar school.

"Each stage of education should be complete in itself. Elementary education should be directed exclusively or chiefly to the needs of children who will leave school forever at the age of thirteen or fourteen. The great majority of children cannot remain in school beyond that age. The problem of elementary education, therefore, is to prepare these children, who are to be workingmen and workingwomen, to know the best in the world and to get their share of it, and to give their best through their work in exchange. Now, what is to be the nature of their work? It is chiefly the production of material things. Hence, since so much of their life will deal with material objects, the manipulation of these objects by hand and eye is one of the first elements of training which these children who are to be workers should receive.

THE COUNTRY BOY HAS THE ADVANTAGE.

"In the simple agricultural life of our fathers many boys and girls got this training on the farm, where there were plenty of chores to do, animals and plants to tend, tools to make and mend and use. Next to the farm in educating power comes the seashore, with its perpetual battle with fickle and treacherous elements. The increasing concentration of population in cities is raising up a generation of children who have

in their home life no means of acquiring the rough discipline with plow and hoe against a stubborn soil, or with oar and sail and rudder against a threatening sea. The city, cut off from field, forest, stream, and sea, tends to breed a race of mental dwarfs and moral cripples. Living in a ready-made world, in which there is little or nothing left for them to do, they come to school with flabby minds as well as flabby muscles, with undeveloped wills as the counterpart of unused hands. The city has its compensation. In many respects the city boy gets the start of his country cousin. But in the fundamental quality of getting the most out of life, and giving his best back to it, the country boy is at a great advantage. I suppose that is one reason why the most successful men in the business and professional life of the cities themselves are almost invariably country-born and bred.

"The problem of the city school is now to stem this tide; how to put its children on a level with their country cousins, and save them from the degeneration which threatens them. Now the old curriculum, well enough in its way as a supplement to the real training which the farmer's children got in the field and the barn and the shed and the shop, is utterly inadequate to do the work required to make the city boy get the best there is in the world, and give the best there is in him. For with its reading of detached sentences from printed pages, its writing in imitation of the copy, its rules of grammar committed to memory, its monotonous reviewing of arithmetic, its mechanical memorizing of the fixed boundaries of geography, and its history recited by rote from a single and ultimate text-book, it was as artificial, mechanical, ready-made an affair as the uniform tenements and paved streets from which the mass of the city children came.

THE KINDERGARTEN.

"The kindergarten has come as the first great gospel of salvation to the city child. The kindergarten teaches the child, as nothing else at that stage can, the great lesson of how to get the best the world has for him, and to give his own best in return. The kindergarten stage, however, must not be unduly prolonged. Its value lies in appeal to involuntary attention at a time when involuntary attention is the child's whole stock in trade. By the time a child is six or seven at the latest he should be well started on the road to voluntary attention to unwelcome tasks. To prolong the exclusive kindergarten idea much beyond that age is to weaken and debilitate the will and to leave the last stage of the kindergarten product worse than the first. This is a mistake to which our public-school system is not addicted; but it is the cardinal defect of a certain class of private schools which cater to the children of the rich. When the pampered prodigies produced by the elongated kindergartens enter the secondary school, their flabby wills and atrophied mental muscles make a sorry showing in comparison with the sturdier youth who have half a dozen years or more of discipline in doing hard and even disagreeable intellectual work. The best friends of the kindergarten are those who limit it strictly to its proper sphere, within which it is incomparable.

VALUE OF MANUAL TRAINING.

"The true continuation of the kindergarten is not found in the devices for making history and geography amusing, but in manual training, which trains hand and eye to delight in doing hard physical work well, and making material objects useful and beautiful. Manual training brings out steadiness, persistence, patience, precision, thoroughness; virtues which real book-learning seldom imparts, but on which its excellence depends. The great majority of school and college graduates who have had

neither industrial nor artistic training manifest an impatience in the presence of petty obstacles, an irritability at delay and discouragement, a disinclination to the drudgery of which every useful life must be full. Manual training, with its severe standards of neatness, accuracy, form, and finish, with its progress to more and more obstinate material, should follow the kindergarten, and give to the city youth such equivalent as it can for chores and jobs, the tasks and risks of the young farmer, hunter, forester, and fisherman. It gives dignity to the work which the great majority of these children must do in after-life. Sewing and cooking and household acts for girls are equally essential, if they are to grow up into anything better than anæmic, incompetent, superfluous competitors for a bare subsistence in half a dozen overcrowded lines of 'genteel' employment.

ATTENTION TO PHYSICAL HEALTH.

"Physical training and attention to the conditions of physical health are equally essential for everybody who expects to get the best out of life. When the struggle for existence was chiefly physical, the weaklings were weeded out by the process of natural selection. Now that the struggle for existence in our city life, and complex industrial system, is chiefly nervous and mental, the physically weak and nervously unstable get a chance to survive and propagate their kind. The premium which city life puts on a nervous tension and mental smartness tends to a corresponding lowering of the physical vigor. Everywhere we go today we find washed up on the shores of our tempestuous business and professional life the stranded wrecks of insomnia, dyspepsia, heart failure, and nervous prostration, and the countless forms in which outraged nature wreaks her righteous wrath.

"By simple gymnastic exercises in the schoolroom, and, where it is possible, by a gymnasium in connection with the school buildings; by ample playgrounds, and encouragement to play active outdoor games, the school must undo the work of bad heredity on the one hand, and forestall as far as possible the strain of competition and complexity which business and society will soon impose. For without a sound, strong, healthy body one can get but little pleasure out of life, and can contribute but little valuable service to the world.

"In conclusion, as the best expression of what ought to be true of our common schools, I commend to you the tribute to John Ruskin which a disciple has placed in Westminster Abbey: 'He taught us to hold in loving reverence the poor man and his work, the great man and his work, and God and his work.'"

On the evening of the 18th a banquet was given to President Hadley, of Yale University, by the Connecticut schoolmasters. It was attended by about one hundred and twenty-five, and was an event of considerable importance, being the first occasion on which representatives of the secondary schools of the state and the Yale authorities had met each other officially. It was especially noteworthy because of the frank expression of views on both sides as to the relation which should exist between Yale and the public high schools. The feeling that Yale should adopt some system of equivalence in entrance examination was strongly expressed; or, in other words, should make provision so that a boy who has done four years of satisfactory work in a high school could enter Yale, even if he has no training in Greek or Latin. As it is now, one without this training, no matter how far he has gone in other subjects, is absolutely cut off from further study at Yale, in both academic and scientific departments. The Connecticut school principals asked Yale to accept an equivalent for Greek and Latin,

not less troublesome to acquire, but of more value to a boy who is unable for any reason to go farther than the high school. President Hadley in reply, while making no definite promise, expressed sympathy with this feeling of the principals, saying Yale would consider this matter carefully, and intimated that he would take favorable action.—*Reported.*

QUERIES.

1. WHICH is the best way to treat blue-prints to be used by the boys? "I have tried mounting on cardboard, but perhaps somebody has hit upon a better plan."

2. How much latitude in the choice of models should be left to the teacher? and how much can be safely intrusted to the pupil's own initiative?

5. (*a*) Ought I to recommend the use of a desk cover or some similar schoolroom device in our grammar grades? (*b*) If so, what form of desk cover is most satisfactory? (*c*) What tools should accompany it, and what will such an outfit cost?

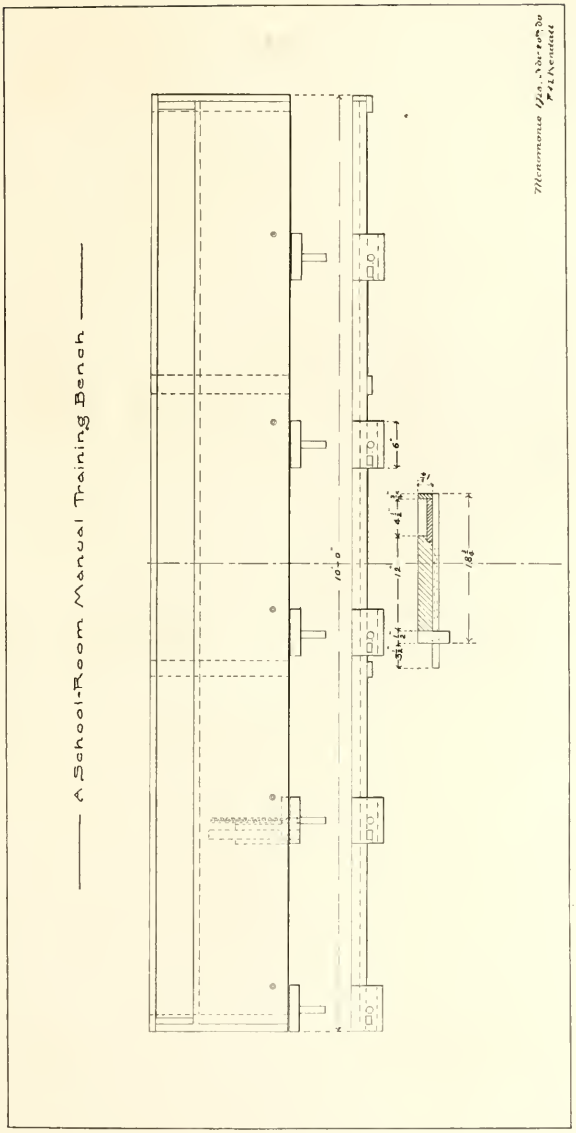
REPLIES.

1. We use heavy paper in making our blue-prints and leave them unmounted. In order to support the print and properly display it, we use what are known to the trade as "small handy clips," which are hung on hooked rods, the same as supplied by the F. E. Reed Co. on its manual-training lathes. We have these rods mounted on our lathes and wood-working benches, forge-shop tool-stands, and machine-shop tool-stands. The rods and clips are not expensive, do not take up much room, are not clumsy or unsightly, do not get broken, and the prints can instantly be attached or detached. We keep our prints in filing cabinets, and when they become very much soiled, they are simply thrown away and new ones substituted, which is not required as often as might be thought. This does away with the expensive mounting process, and when a model is discarded or changed, it is but little trouble or expense to make new prints. It is entirely satisfactory.—CHARLES B. HOWE.

2. A satisfactory answer to this question cannot be given to cover all cases. Everything depends upon the particular teacher, the pupils in hand, and many local conditions. Some pupils are ready to choose what appears to them the easiest thing to make, when they have the capacity for something more difficult; while others are inclined to be too ambitious and desire to undertake that which is beyond them. The pupil should make the model from which he will derive the most benefit through the construction; if he has an original design, or a cherished model that meets the requirements, it certainly ought to be the one that he is allowed to make. On the other hand, it would be a fatal mistake to turn the child loose and allow him to follow the dictates of his fancy. In the last analysis each case must be decided upon its merits by the good judgment of the teacher.—CHARLES B. HOWE.

5. (*a*) The writer would certainly recommend an adequate outfit of suitable schoolroom benches and tools for the class that has not access to a manual-training school shop. The pupils should stand for their work, so as to escape the cramping contingent to working seated.

(*b*) That form is the best that most nearly meets the conditions of the school shop. The schoolroom bench shown in the photograph is in use in an outlying grammar


A School-Room Manual Training Bench

school in Menomonie, Wis., and gives a range of work equivalent to that of any school shop in grammar-grade work. The bench is placed on the tops of the chairs or desks along the aisle, and is held in place by cleats, so situated that they come next to the backs of the chairs. This bench is heavy enough to stay in place without further fastening, but not so heavy as to prevent easy removal by the pupils. The material of the bench is pine throughout, and the vises are of maple. The vise-screw and nut is part of a 12-inch hand-clamp. The drawing shows the construction and dimensions. When not in use, the bench is hung under the blackboard at the side of the

room. The tools are kept in trays in a closet. The cost of such a bench is $5 to $8, according to finish and material.

(*c*) The tools used are the common bench tools of good grade; there are not so great a number as for a larger class, for the pupils are nearer each other and can make better use of the tools. The outfit for ten pupils is: four Bailey 15-inch jack planes and shooting boards; four 10-inch back saws, which are used in a slot cut in the cleat of the shooting board; five tack hammers and three light claw hammers (each pupil is to own a jack-knife with two blades, to cost about 25 cents); ten 2-cent rules; one 8-inch try square; one 8-inch gauge; one 8-inch bevel; one bit brace, and ¼-inch, ½-inch, ⅝-inch, and ¾-inch bits; six assorted sizes of brad awls and handles, from $\frac{1}{32}$ inch to ⅛ inch; one set of six chisels from ⅛ inch to 1 inch; one gouge of 1¼-inch radius; one 28-inch rip saw; one oil stone and can; nails, glue and sandpaper. Pine and other stock varies from ⅛ inch to 2 inches, and is delivered planed. The grades using the outfit are 5 to 8 inclusive. The time is one hour a week, which is placed just before recess or dismission, so the floor may be cleaned. The cost of the tools is about $20, making the entire cost for ten pupils not far from $30.— F. W. KENDALL.

BREVITIES.

SECRETARY SHEPARD has announced that the next summer meeting of the National Educational Association will be held in Detroit, Mich.

M. GABRIEL COMPAYRE, the distinguished French educator, has said, in speaking of the American educational exhibit at the Paris exposition: "If anyone asks me in what the Americans, according to their showing at this exhibition, excel, I certainly shall reply that it is in manual training, in penmanship, and in drawing."

THE next meeting of the Department of Superintendence of the National Educational Association will be held in University Hall, Fine Arts Building, Chicago, February 26–28. President Arthur T. Hadley, of Yale University, will give the lecture on the opening evening. One session will be devoted to manual training and domestic economy. The purpose of this session is not to devote the time to theoretical discussion of these subjects (although that will not be entirely ignored), but to reports of what is actually being accomplished, with something of the details of administration in carrying on this work in elementary schools. President Harvey states that he expects to have reports of the work being done in Detroit, in Menomonie, Wis., Chicago, and possibly one other city. Such a program under such auspices should attract to the meeting many of the manual-training supervisors.

MASSACHUSETTS.

THE school board of Springfield, Mass., has recommended to the city government that a new manual-training high-school building be erected. This recommendation will come up for discussion and action soon after the first of January.

IN a recent letter to the *Wisconsin Journal of Education*, referring to high-school enrollments, Dr. Frank A. Hill, secretary of state board of education in Massachusetts, said: "We have in Massachusetts today not a few people who have been led to think that 92 per cent. of our school children never enter the high school, when it has been proved over and over again that, if the state is taken as a whole, more than 25 per cent. of the school children enter the high school and enjoy its advantages, while in scores of places among us as high as 50 per cent., and even more, of all the children in the public schools reach the high school. Where the high school is fully established and ably conducted, the children are now moving into its grades about as freely and in about as large numbers relatively as they move into the elementary grade below."

BOSTON.

CARDBOARD construction has been regularly introduced, as a part of the course of study, into the fourth and fifth grades of some fifteen of the grammar schools. In several of these schools, where the sixth grades have not attempted the woodwork, an advanced course in cardboard construction is being given.

The Manual Training Club is conducting a high-class, semi-popular course in forestry, trees, and woods.—JOHN C. BRODHEAD.

A SENSIBLE disposition of the bequest left by Benjamin Franklin to the town of Boston seems likely to be made at last. As is well known, Franklin left a sum of

money which was to be invested for a hundred years and the proceeds devoted to some educational plan for the benefit of mechanics and artisans. The funds now amount to over $500,000 and have been for two years awaiting the development of a feasible plan for utilization. It was proposed last winter to expend half the money upon a building similar in character to Cooper Union, New York, and to use the other half for public baths and gymnasiums. This would, of course, divide and scatter the fund and would increase the likelihood of its being of use to political factions. Now, however, it has been formally recommended that the entire fund be used to defray the cost of erecting, furnishing, and equipping a building to be known as the Franklin Institute. The site is to be donated by the city. The institute is to consist of quarters for a branch of the public library, shops, laboratories, and class-rooms; in fact, all facilities for the highest type of industrial education.

There is no doubt that such an institution will be a fitting tribute to Franklin's memory.—*School Journal.*

MAINE.

THE new manual-training building at Portland, Me., is to be of stone, brick, and steel construction, with hard pine and oak finish. It will have five large well-lighted rooms, heated and ventilated by the most approved method now in use. Three of the rooms will be used for the manual-training classes from the three upper grades of the grammar schools. The system taught is largely sloyd. The classes receive from one hour and twenty minutes to two hours and forty minutes of instruction per week, according to the grade, the upper classes claiming more time than the lower ones. The two basement rooms will be fitted with wood- and metal-working machinery and tools for advanced work. The building is built from funds of the Hon. Joseph Walker estate, and will be known as the Walker Manual Training School.—GEO. H. BABB.

NEW YORK.

AT the annual meeting of the New York Manual Training Teachers' Association the following officers were elected for the ensuing year: president, Mr. Fred. J. Foster, P. S. 79; vice-president, Mr. Robert G. Weyh, P. S. 154; secretary, Mr. George F. Stahl, P. S. 155; treasurer, Mr. Harold Peyser, P. S. 77.

A regular meeting of the association is held on the first Thursday in each month. The topics of discussion at the November and December meetings were, respectively, "The Application of Educational Principles to the Teaching of Woodwork," and "Industrial Training in its Relation to the School." Papers on these subjects were read by Messrs. W. F. Vroom and Harold Peyser.

Recent appointments to the staff of shopwork instructors in the boroughs of Manhattan and the Bronx are as follows: Mr. J. T. Breitwieser, P. S. 40; Mr. G. B. St. John, P. S. 34; Mr. Charles J. Lagerwall, P. S. 15; Mr. D. L. Connelly, P. S. 101 and 173.

Every year marks a distinct advance in the work of the manual-training department at Teachers College. The attendance is larger than ever before, and includes a class of students, some of them teachers of experience, whose presence indicates the high reputation the college has earned as a training school for teachers in this important field of work.—W. F. VROOM.

THE new building for the Rochester Mechanics Institute, recently given by Mr. George Eastman, will, when completed, become the home of the departments of industrial and fine arts. The old building will be given up to the manual-training classes.

BROOKLYN.

THE long-looked-for and sadly needed new building for the Brooklyn Manual Training High School seems about to materialize. The sketch plans which have been submitted call for a building over two hundred feet square and five stories high. The Borough Board seems determined that it shall accommodate two thousand students, although Principal C. D. Larkins is anxious to limit the number to fifteen hundred. The plans provide for a large auditorium to seat the whole body of students, besides several smaller lecture-rooms, gymnasium, and all the shops and laboratories necessary for a fully equipped manual-training high school. The site is to be on Seventh avenue, Park Slope, one of the highest and most attractive sections of the borough. —EDWIN W. FOSTER.

PENNSYLVANIA.

AT a dinner given in Pittsburgh to Mr. Andrew Carnegie and the trustees of Carnegie Library, on the fifteenth of November, Mr. Carnegie announced that, if the city would provide a site for a polytechnic school near the Carnegie Library, he would erect a building for such a school and endow it with $1,000,000 in 5 per cent. gold bonds. In the course of his speech Mr. Carnegie said: "I believe that a first-class technical school, probably as large as that at Worcester, would develop latent talent around us to such extent as to surprise the most sanguine. If the city of Pittsburgh will furnish a site, which, I hope, will be of ample size for future extensions, I shall be delighted to provide the money for such a school, taking care to provide room for additions to the buildings to meet the certain growth of Pittsburgh."

COLORADO.

ASPEN, Colo., is awakening to the need for manual training in its public schools The Mothers' Club of that city is taking an active and personal interest in the matter, and only lack of funds, not lack of interest, prevents some immediate action on the part of the school authorities, from introducing manual training in some form.

THE Denver Manual Training High School has an enrollment of 457, about one hundred more than last year. Of these 457, 247 are boys and 210 girls.

CALIFORNIA.

THE Southern California Teachers' Association held its winter session at Los Angeles, December 19 to 22. President Walter A. Edwards, of Throop Polytechnic Institute, was chairman of the manual-training section. Following was the program:

1. "How can material results, obtained in the manual-training room, be utilized in the recitation-rooms and the home?" Frank H. Ball. Discussed by Charles A. Kunou.

2. "What has been achieved and what remains to be done in introducing manual training into the public schools?" D. C. Reed. Discussed by Miss Florence Stevenson.

3. "Observations on the required work in manual training in the schools of Los Angeles city and county." Arthur H. Chamberlain. Discussed by A. L. Hamilton.

The city and county teachers' associations, meeting at the same time, also gave a prominent place on their programs to the discussion of handwork.

THE following appointments of graduates of the normal department of domestic science of Throop Polytechnic Institute have been made; Miss Katherine K. Barker and Miss Louise Lyde, to teach cooking in Los Angeles; Miss Lucy Anderson and Mrs. Jessica Hazzard, to teach sewing and cooking in the Los Angeles State Normal

School; Mrs. Rose Defoe, to teach cooking in the San Francisco schools. Miss May Blanford teaches cooking in Los Angeles; Miss Mary Gower and Mrs. Jessica Hazzard are studying in Teachers College, New York.

MR. C. C. BOYNTON, of the Fisk Teachers' Agency, is carrying on classes in elementary manual training. Miss Sallie Peabody is the teacher.

DOMESTIC science is being taken up to a considerable extent by women's clubs through the southern portion of the state.

THE new building of Throop Polytechnic Institute is nearly completed, and the dedication exercises took place on Founder's Day, December 13.—ARTHUR H. CHAMBERLAIN.

MR. EVERETT W. SCHWARTZ, principal of the Wilmerding School of Industrial Arts, died November 22. Mr. Schwartz was for several years in charge of the manual-training work at Waltham, Mass., from which place he went to California. Earlier he was a teacher in the Comins School in Boston, and in the Cook County Normal School, Chicago. To many he was known best as the instructor for several years in charge of the manual-training work at the Martha's Vineyard Summer Institute. He was the author of a book entitled *Sloyd, or Educational Manual Training with Paper, Cardboard, Wood, and Iron, for the Primary, Grammar, and High Schools*, which was published in 1893 by the Educational Publishing Co. Mr. Schwartz's death seems particularly untimely owing to the fact that he had but just begun a great work at the Wilmerding School.

AT the recent election in California the people voted upon an amendment of the state constitution exempting from taxation the California School of Mechanical Arts. It carried by a significantly overwhelming majority of nearly 40,000.

THE Department of Manual Training and Drawing of the California State Teachers' Association announced an exhibition of school work for the meeting held in San Francisco, December 26–9.

CANADA.

ONE of the manual-training schools established through the generosity of Sir William Macdonald, of Montreal, was recently opened in Ottawa by Lord and Lady Minto. In the course of a felicitous address Lord Minto said:

"It is with profound pleasure and keen expectation that we welcome to Canada and to this noble and useful work in our midst the manual-training teachers who have come from Great Britain, and also the United States. They may be assured that those of us whose school days are long past will have an interest in the labors as deep, if not so evident, as that of the boys in their classes.

"But, ladies and gentlemen, I would ask you to understand that manual training is not intended to teach any trade, or even the elements of any trade, as such. Only as the alphabet and the art of reading are necessary to the literature of all professions, so manual training fits a boy to begin his apprenticeship to any trade with greater aptitudes and correspondingly better chances to be a skillful, excellent workman.

"I hope it will be understood that manual training does not aim at preparing the pupils to earn their living through manual work, although it does help them in that most honorable and laudable purpose after they take up their lifework, whatever it may be. Because the boys like it, it helps to keep them longer at school, and thus gains for them a more thorough education in other respects also.

"By the end of the present year provision will be made in equipment and instructors for training about five thousand boys and several hundred teachers. One may truly say that the scheme is one of high statesmanship in its plan, methods, and endowment.

"If I may be allowed to refer to one thing which the Macdonald manual-training fund does not provide for, it will be rather to suggest what some likeminded benefactor may do for the girls than to imply that Sir William's benefaction is not complete in itself.

"The fund provides for the training of boys only. Manual training and practical instruction for girls in schools are not less important than for boys, though the subjects and exercises for girls would naturally be different from those for boys. Such exercises are admirably furnished by courses of study and practice under the heading of domestic science; and it augurs well to know that in other countries and in other cities domestic science for the girls in the schools has followed close on manual training in woodwork for the boys.

"Her Excellency the Countess of Minto and myself are greatly delighted with the keen and thoughtful interest with which the movement to introduce domestic science into the schools is already being supported in many quarters. We learn with great satisfaction that it is being favorably considered in and for Ottawa and several other places at the present time, and I can assure you that no one is more deeply interested in the scheme than Lady Minto herself."

THE Household Economic Association of Canada is conducting a series of lectures in each of the following cities and towns: Hamilton, Toronto, Whitby, Peterborough, Ottawa, Montreal, Kingston, and St. Thomas. Four of the lecturers have been from the United States: Mrs. Ellen Richards, of the Massachusetts Institute of Technology; Mrs. Nellie Sawyer Kedzie, of Bradley Polytechnic Institute; Miss Anna Barrows, of the *American Kitchen Magazine*; and Mrs. Helen Campbell. Mrs. Kedzie has just completed a highly successful tour of these places, and is enthusiastic over the prospects for domestic economy in the schools of Canada.

WISCONSIN.

SENATOR J. H. STOUT, of Menomonie, Wis., the founder of the Stout Manual Training School, has again shown his deep interest in education in a most practical way. He has signed contracts for the construction of a natatorium and gymnasium which when completed will have cost about $60,000. It will be connected with the public-school system of Menomonie, and will be located near the high school and the manual-training school. The size of the new building will be 99 × 132 feet, three stories high. It will be attractive architecturally, though its chief glory will not be its façade, but its perfect plan and equipment. To the end that it be as perfectly suited to its use as possible, nothing will be spared in time or thought or expense. It is characteristic of Mr. Stout's philanthropy that it is manifest not merely in gifts of money, but in constant study and broad human sympathy. Such giving is of the highest type. Moreover, it is not to one city or one county that such gifts are made. The influence of Senator Stout's manual-training school, his traveling libraries, his itinerant art collections, and his county training school for teachers has gone far beyond the borders of the state of Wisconsin. Studied by hundreds of visitors from all sections of the country, the educational work centering in Menomonie is furnishing practical suggestions for communities far remote from Dunn county.

In speaking of manual training at one of the meetings of the Wisconsin State Teachers' Association President Charles Kendall Adams, of the State University, said: "We have in this state the best manual-training school in the country, and probably the best in the world. At the Menomonie school boys and girls are taken from the grammar school and high school into the manual-training department for an hour a day without in any way detracting from the amount or quality of their lessons in the regular program. The testimony is uniform that the pupils all look forward to the hour with pleasure, and it is hard to see how anyone can observe what they accomplish without perceiving that the hour must be as profitable as pleasarable. The boys are taught the arts of working in wood and metal, and the girls are thoroughly drilled in the mysteries of the sewing-room, the kitchen, and the dining-room. Many students become very proficient in drawing and the arts of design."

MICHIGAN.

Superintendent Elson, of Grand Rapids, is to be congratulated on his success in securing an appropriation of $5,000 for the introduction of manual training. This amount seems small for a city of the size of Grand Rapids, but this is sure to be used in such a way that a larger one will follow next year, if needed. The work is to be under the direction of Mr. George S. Waite, formerly of Toledo and during the past year in charge of the work at Kalamazoo. Mr. Waite will not be allowed to give up his work in Kalamazoo, but will spend half of his time in each place. The following teachers have been chosen to assist Mr. Waite in Grand Rapids: Maud Fuller, cooking; Helena F. Van Duren, sewing; Nellie E. Wales, sloyd; Ruth M. Chapin, sloyd; Florence M. Meade, sewing, Work will begin January 2. It will be given to 3,500 pupils in the fifth, sixth, and seventh grades. Later they expect to "expand."

Some interesting figures come from Kalamazoo. The total expense of the manual-training department of the public schools last year (and last year was its first year in Kalamazoo), including equipment, supplies, and teachers, was $3,763.49. Taking the average enrollment for the year at 1,400 pupils and the expense on account of material $458, the cost per pupil was less than 33 cents.

ILLINOIS.

Mr. James Milliken, of Decatur, has offered to give $400,000 toward an industrial school to be under the control of the Presbyterian Church.

CHICAGO.

Miss Anna Belden, late of Armour Institute, is now associated with Miss Anna Murray in the Chicago Sloyd and Industrial School. Miss Belden is in charge of the work in sewing, dressmaking, embroidery, and the study of textiles.

Mr. Laurens L. Simpson, last year a student assistant in the department of manual arts at Bradley Polytechnic Institute, is now teaching manual training and mechanical drawing at the South Side Academy.

Mr. Fritz Reichmann, who during the past year held the highest scholarship in physics at the University of Chicago, is now teacher of manual training at the Morgan Park Academy. Mr. Reichmann taught three years at the University of Texas.

EDITORIAL.

The Northeast Manual Training School of Philadelphia has made an important contribution to the discussion of manual training by publishing in its catalogue just issued several testimonies from university presidents as to the value of manual training to the young man who pursues his education beyond the secondary school. These testimonies were elicited by Mr. Julius Stern, a graduate of the Northeast Manual Training School and a student in the law department of the University of Pennsylvania. They are so timely and carry with them so much weight of authority that we reprint them in full :

From the President of Harvard University.

Asticou, Me., October 2, 1900.

Dear Sir : I should like to see some form of manual training made part of the education at school of every boy who is to come to college. It not only trains the eye and the hand, but develops the habit of accuracy and thoroughness in any kind of work. Moreover, it develops the mental faculties of some boys better than books do.

Sincerely yours,

(Signed) Charles W. Eliot.

From the President of the University of Chicago.

Chicago, October 11, 1900.

My dear Mr. Stern : Complying with your request, I am glad to say that our experience in the schools connected with the University of Chicago leads me to the conclusion that manual training in due proportion in the elementary and secondary schools gives breadth and power which become an effective means in higher education. Nor is this true merely in the case of those who are pursuing courses in engineering ; other things being equal, every young man and young woman is the better fitted for the higher work of the university for having trained hands, and the power to plan and execute which comes through manual training.

Yours very truly,

(Signed) William R. Harper.

From the President of the Johns Hopkins University.

President Daniel C. Gilman, of Johns Hopkins University, refers Mr. Stern to his published article on "A Plea for the Training of the Hand," in which he says :

"Manual training is an essential part of a good education, whether that education is restricted to the common school or carried on to the highest discipline of technical schools and universities."

From the Provost of the University of Pennsylvania.

PHILADELPHIA, October 22, 1900.

DEAR SIR: It is to me no matter of surprise that manual training has taken so prominent a place in modern education. The increasing use of laboratory methods in professional schools is in recognition of the fact that no amount of didactic teaching can cover the whole ground in any of the sciences, and that mental concepts must have the aid of actual experimentations. If the service of the trained eye and trained hand is an essential to the mental grasp of the higher sciences, it cannot but be that the training of these organs will be helpful to mental activities of any kind. With a proper apportionment of time, I believe that manual training may be made a part of the curriculum of any school; and that, so far from hindering, it will actually advance the education of the student in other and more abstract directions.

Sincerely yours,
(Signed) CHAS. C. HARRISON.

From the President of Lehigh University.

LEHIGH UNIVERSITY,
SOUTH BETHLEHEM, PA., October 9, 1900.

DEAR SIR: Our experience at Lehigh University with the graduates of the manual-training schools of Philadelphia and other cities has been most favorable. The courses of instruction in these schools is an admirable preparation for engineering colleges. It is not merely that the boys have been taught the use of tools; it is rather that their minds have been trained through the medium of the eye and the hand. Desirable as it is to teach a boy the elements of handicraft, and useful as this accomplishment may be in after-life, it is an entirely false idea of the purpose of manual-training schools to suppose that this is the end aimed at. The education of a boy is the more complete and thorough the more avenues that are opened up for his enlightenment, and manual training, when systematically and intelligently carried out, gives the boy facts and thoughts which he would fail to get in the class-room.

(Signed) T. M. DROWN.

From the President of Cornell University.

ITHACA, N. Y., October 1, 1900.

DEAR SIR: In reply to your letter of September 28 I would say that I am a firm believer in an education which trains and develops the whole man. The hand is man's best servant, and some modicum of manual training should be included in the school training of every child of the present time.

Very truly yours,
(Signed) J. G. SCHURMAN.

From the President of the University of Michigan.

ANN ARBOR, October 24, 1899.

DEAR SIR: The introduction of manual training into our high schools is rapidly and deservedly gaining favor in this part of the country. It is now recognized that it has a distinct and positive intellectual and pedagogical value.

Yours truly,
(Signed) JAMES B. ANGELL.

From the President of Leland Stanford Junior University.

STANFORD UNIVERSITY, CAL., October 9, 1900.

DEAR SIR: I am in receipt of the catalogue of the Northeast Manual Training School of Philadelphia, and have examined it with much interest. I have always recognized the value of manual-training high schools, in which a good secondary education is given in connection with manual training. Such schools rise above the level of mere trade schools, and through their breadth of view, accompanied by practical drill, are doing a good work in America. We need more of them. Those interested in better education would not have such institutions take the place of the classical high school. They should rather develop side by side, and each should be equally open to all who can make use of their work. From this it follows that, if each is a good preparation for life, each is also a good preparation for college, and that the colleges and universities of the United States should recognize this fact in their entrance requirements.

We have a number of graduates from manual-training high schools among our students, and we find them fully capable of holding their own with the graduates of classical high schools.

Very truly yours,

(Signed) DAVID S. JORDAN.

From the President of the University of Wisconsin.

October 10, 1900.

DEAR SIR: I believe that every school which can afford to have a manual-training department will be profited by it in every way. The scholarship of the students need be in no way interfered with, and an interest will be created which is of sure value in after-life.

Very respectfully yours,

(Signed) C. K. ADAMS,
President.

From the President of the University of Illinois.

CHAMPAIGN, ILL.

DEAR SIR: Replying to yours of the 27th ult. I will say that I have long been of the opinion that our educational work should give much larger recognition to industrial or manual training.

I think this remark applies to all of our work, from the primary to the university. I do not think that manual training is incompatible with intellectual development, but, on the contrary, that it promotes and supports healthful mental growth. I think it contributes to versatility, to contentment, to rational and productive living, and so to good citizenship; and accordingly that it should be recognized and helped on by all who have any interests in popular education, and particularly by all who have any share in the management of the public educational system of the country. I am,

Very truly yours,

(Signed) A. S. DRAPER,
President.

DR. C. HANFORD HENDERSON, whose article in this issue so fittingly introduces the new century, was one of those "unfortunate" youths of two decades or more ago whose education was "neglected."

He received very little formal instruction before he entered college. After graduation from the University of Pennsylvania in the early eighties he taught physics in the Central Manual Training School of Philadelphia. Later he spent one year at Zürich, where he took the degree of Ph.D. On his return to America he became principal of the Northeast Manual Training School, Philadelphia, a position which he gave up in June, 1896, for the principalship of the Chestnut Hill Academy, Chestnut Hill, Pa. After one year, in September, 1897, he went to Harvard University, where he took advanced courses and did some lecturing. In September, 1898, he became director of the high-school department of Pratt Institute. Last June he went to Europe, where he is now spending a year in study and travel. Dr. Henderson is widely known through his writings. His articles, which have appeared from time to time in the *Popular Science Monthly* and the *Atlantic Monthly*, have won for him a high place among the popular writers on education. It is safe to say that he has done more than any other man in America during the past decade to put into clear and attractive form the claims of manual training to a place in general education.

In spite of our efforts to produce a magazine correct in every detail, an occasional error has seemed to be inevitable. On p. 42 of the October number was a paragraph beginning: "Mr. Entwistle feared that the idea of originality was being carried too far. A child who was familiar with historic forms and principles of design could not originate things satisfactorily." The word "familiar" in the last sentence should have been "unfamiliar." It was so written by the author of the article, Mr. Vroom, and corrected by him in the galley proof, but failed to be changed by the printer, and was not noticed in the page proof. In a recent letter referring to this error Mr. Entwistle expresses the belief that "the more we familiarize ourselves with the best of the past, the better able shall we be to create something new." Another error in the October number which frustrated the plans of one of our most valued patrons was the omission of the full-page advertisement of W. C. Toles & Co. This was wholly due to the mistake of a clerk in the advertising department. We particularly regret the blunder because Mr. Toles signed the first contract for advertising in the magazine.

REVIEWS.

BOOKS.

Manual Training Syllabus. High School Department. University of State of New York, Albany. $9\frac{3}{4} \times 6\frac{3}{4}$ inches. Pp. 284; paper covers. Price, 10 cents. — This valuable booklet contains (1) a chapter on manual training in elementary schools, (2) one on manual training in high schools, (3) a bibliography, (4) several outlines of courses of study, and working programs for high schools. Sixteen full-page illustrations add much to the value of the book.

It is the general impression among teachers, at the present time, that the problems of manual training in the secondary school are much nearer a satisfactory solution than those in the elementary school, but one basing his judgment on this syllabus alone might easily reach the opposite conclusion. This is due to the fact that only one scheme of work is presented for the elementary school, and that one most carefully wrought out, whereas several schemes are presented for the secondary school, and these are given with unequal fullness of detail and accompanied by a variety of illustrations. This is fortunate from one point of view: There is certainly great need of something more definite and practical in the way of suggestions for the elementary school, and it is equally important that the work of the secondary school be enriched and broadened.

The course for elementary schools, which is that given at the Horace Mann School, connected with Teachers College, New York city, is specific, broad, and full of practical suggestions. Every teacher of manual training in elementary schools should give it careful study.

For the secondary schools the course in woodworking has many excellent features, but the carving, in the form suggested, seems out of harmony with the rest. The course in metalworking, likewise, has many excellent features, but this course needs to be unified. The offering of alternate courses in sheet-metal work and bent-iron work is not satisfactory. Every boy should do something in each of these lines. This whole subject of metalworking for secondary schools is in need of more thoughtful attention on the part of teachers of manual training.

The course in home science, covering as it does work for both boys and girls, is something so new in many of its features that one feels the need of asking many questions as to its practical operation before reaching any conclusion as to its value in the form presented.

The extensive bibliography on manual training and home science is up to date, and a valuable feature of the book.

The groups of studies are under three heads: liberal, professional, and technical. Two or three periods a week in each group are assigned to drawing during the first two years. Manual training is found only in two of the technical groups — the manual training and the home science, and here in the last two years. This arrangement is not satisfactory, even if manual training were in the elementary schools, and certainly not if no manual training precedes the high-school course. This concrete work

should come earlier. Some way should be found to place the manual training in the first two years of the course. It ought to be practicable to require all students, whether in technical, liberal, or professional courses, to take manual training during their first two years in the high school, if they have not previously taken such work in the grammar school. Every boy ought, before he enters the third year of his high-school course, to have done the equivalent of two years' work in manual training — preferably one in wood and one in metal — of such a character as has been found practicable in the two upper grammar and the two lower high-school grades.

Freehand Perspective, by Victor T. Wilson, of Cornell University — a 5½ × 9 inch, 257-page book with 139 illustrations — published at $2.50 by John Wiley & Sons, New York, takes its place with Ware's *Modern Perspective* and Millar's *Essentials of Perspective* as an authoritative work on the subject. Just as the former is the standard work with architectural draftsmen, and the latter with artists, so Mr. Wilson's treatise will take its place as the standard work on the subject for engineers and engineering students.

"How sweet a thing is perspective," wrote Paolo Uccello, and how many are the points of view of those who write upon the subject! This work is an attempt to reconcile the "unnecessary and undesirable antagonism" appearing to exist in the minds of most students between the actual drawing of an object and the principles of linear perspective.

After proving the two fundamental laws of perspective — that parallel lines have a common vanishing point, and the farther an object recedes from the picture plane the smaller it becomes — the author considers the horizon and the vanishing traces of other planes, the center of vision, plane of picture, etc., and takes up the measurements of lines, treatment of curves, and gives rules for finding measuring points. Practical problems and illustrative examples are considered in connection with these demonstrations. Chapters upon the estimation of the values of plane angles and problems in tangent and intersecting planes prepare the student for the phenomena of shadows and their perspective treatment. The last chapter — upon perspective sketches from working drawings — is particularly valuable, and will prove very suggestive to any draftsman, even if he is without the knowledge of descriptive geometry necessary to understand the preceding chapters.

No one should open this book expecting to find a new and easy road to profi ciency in drawing — in fact, it would be unfortunate to have a beginner try to learn to draw with the mathematics of the subject so clearly before him; but as a corrective to the loose and superficial drawing so common in our public schools the course outlined "for use in manual-training schools and colleges" could not be improved upon. — FRANK FORREST FREDERICK, University of Illinois.

Handrailing Simplified. (Sectorian System.) Edited and revised by Fred T. Hodgson. Published by William T. Comstock, 23 Warren street, New York city. 7½ × 5 inches. Pp. 52. — A practical book for stair designers and builders.

PAMPHLETS.

A Selected Bibliography of Manual Training. Prepared by the Eastern Manual Training Association. Foster H. Irons, secretary, East Saginaw, Mich. This is a revision of the bibliography published in 1898 by the American Manual Training Association, and is just what is wanted by everyone who is going to make a thorough

investigation of manual training, or who needs a handy list for reference now and then. While it is not a complete bibliography of the subject, it is of much more value than a complete one possibly could be, because many useless and undesirable books have been omitted. The work gives evidence of having been done with greatest care by those who are thoroughly acquainted with the whole range of publications on this subject. The committee on revision was Charles R. Richards, Gustaf Larsson, and James P. Haney.

The Manual Training Schedule. By Dr. James P. Haney, superviser of manual training, New York city. 10¾ × 7½ inches. Pp. 56.—In this book are gathered together the leaflets furnished the grade teachers for use during the fall term. It gives in condensed form an outline of work in drawing, design, picture study, and constructive work in paper and clay for each week; but it does not include the shopwork. The lessons outlined are intended to be suggestive rather than mandatory, and are designed to serve as an interpretation of the provisions of the course of study in use in New York city. Each leaflet is illustrated.

Reports on Parental and Reform Schools. By Thomas H. MacQueary and Robert M. Smith. Reprint from the Proceedings of the Board of Education of the City of Chicago. This report gives a summary of observations made during an extended trip East, and conclusions reached with reference to the organization and management of the parental school in Chicago. Mr. MacQueary's report gives attention to physical culture, discipline, general organization, and maintenance, while Mr. Smith's gives special attention to manual training. For all pupils in the lower eight grades of such a school, Mr. Smith says the "system should breathe the educational rather than the technical spirit." He considers it undesirable for a boy to begin too early to learn a trade, even in a parental school. "Learning a trade circumscribes, confines, dwarfs." In all cases of boys under sixteen years, he says, manual-training should precede trade teaching. He especially recommends that gardening form a part of the course in this school. Referring to the character of the manual-training work he saw during his trip, Mr. Smith says: "I have noticed on all sides an undoubted tendency to substitute finished articles for abstract exercises, and to make the work more human and educational by appealing unceasingly to the good-will and the interest of the workers."

PERIODICALS.

The Brochure Series of Architectural Illustrations, published by Bates & Gould Co. of Boston, is of inestimable value in a manual-training school. Every teacher and pupil who is interested in the history of art, or appreciates the noble or picturesque in architecture, and refinement and strength in ornament, will find this periodical a mine of inspiration and suggestion. Each number is devoted to one subject, as "Flamboyant Churches in France," "Italian Renaissance Grilles," "Chippendale Chairs," "The Ducal Palace, Venice," and the like. The series up to date has covered a wide range of subjects in architecture, furniture, and ornament. Each number contains one or more short, well-written articles, and several half-tone reproductions from excellent photographs. For example, the number on "Italian Wrought Iron" contains eight illustrations, four of wrought-iron lanterns, beginning with the famous one on the Strozzi Palace, and four of wrought-iron torch-bearers. The influence of such illustrations of the masterpieces of art and craftsmanship is needed in every school, whether it be a manual-training school or one whose distinctive aim is classical. The subscription price of the series is 50 cents a year.

Congratulations are due to the editors and publishers of *Art Education* on the transformation which has taken place in their magazine. It now takes its place among the high-class art journals, this essential difference remaining, however, that its contents is planned with special reference to the needs of teachers. The change in form and general make-up which began with the September issue is in every way a marked improvement. The excellence of the work of the engraver and the printer is in keeping with the quality of the cover design, furnished each month by Mr. James Hall. To appreciate the progress that has been made by this magazine, one has but to compare the current number with the first number, issued in October, 1894. Can it be that the progress of this journal, which was established at so great personal sacrifice on the part of Mr. and Mrs. J. C. Witter, is an index of the progress that art instruction has made in the public schools during the past six years ?

Public School Reports.

New Haven, Connecticut. — Superintendent Kendall says of the Boardman Manual Training High School: "I earnestly believe that the school in its various courses affords a kind of instruction which the secondary schools will offer more generally in the future." Principal Mather gives figures showing an increase of 53 per cent. in the attendance at the Boardman School last year, and estimates that the cost of tuition during the present year will be reduced to $70 per pupil, owing to a further increase in the attendance. He points to the fact that his pupils are carrying full college preparatory work in the academic branches, in addition to the drawing and manual training, and then adds: "I have heard no complaint of overwork, or seen evidence of it, among the Boardman boys, and I strongly feel that, on account of the clearness of perception, care, and accuracy which go into a properly executed piece of handwork or drawing, a boy is better able to understand and make faster progress with his books. Apart from this is the immense gain which comes from skill in the use of hands and eye, and a knowledge of many of the processes in common use about us."

Moline, Illinois.—In his annual report for 1900 Superintendent William J. Cox gives this valuable testimony: "During the past decade manual training has been a regular factor in the school work of this city. Its value has been demonstrated in a thousand ways, and its popularity is constantly increasing. The growing interest in this department is shown by the increasing number of high-school students who are now electing the most advanced courses offered in manual training and mechanical drawing."

The following have been received, some of which will be given more extended notice in the April number:

A History of Education. By Thomas Davidson. Charles Scribner's Sons, New York. Price, $1 *net.*

Mind and Hand. By Charles H. Ham. American Book Co., New York. Price, $1.25.

Woodworking for Beginners. By Charles G. Wheeler. G. P. Putnam's Sons, New York. Price, $3.50.

Constructive Work. By Robert M. Smith. A. Flanagan Co., Chicago. Price, $1.

Report of the U. S. Commissioner of Education, Volume I, 1898–99.

An Historical Sketch. The Mechanics' Institute, Rochester, N. Y., 1885–1900.

MANUAL TRAINING MAGAZINE

APRIL, 1901

INDUSTRIAL TRAINING AS A SOCIAL FACTOR.

FRANK A. MANNY,
Principal of Workingman's School, New York City.

IN a recent article in the *Century*, John Burroughs says: "If we think birds, we shall see birds wherever we go; if we think arrow-heads, as Thoreau did, we shall pick up arrow-heads in every field. Some people have an eye for four-leaved clovers; they see them as they walk hastily over the turf for they already have them in their eyes." It is this view of life and therefore of education as a function of life that is reconstructing our schools and putting them upon a better basis than they have ever stood upon before. Only when we see this clearly are we able to work intelligently and economically in industrial education.

There are two great problems that open out before each human being. First, how to get a living and second, how to get the most meaning out of life. Often, the first overshadows the second and drives it back until it has become to many a half-forgotten dream. If industrial training had to do with the first problem alone and gave it still greater supremacy, we might well hesitate to forward it, but it is only by an adequate answer to the first problem that we are in any sense able to grapple with the second. There never was a time when there was so much common sense on this matter of the relation of the material to the spiritual as now.

In the olden days when men had struggled out of merely animal existence into some realization of the spiritual possibilities of life, there was a dim consciousness on their part of the fact that their children need not go through all that they had gone through, and as a result there was an attempt in education to furnish children with a ready-made experience; the spiritual attainments of the race if at once incorporated in the minds of the young by means of their memories would

save them the toil and care of those who lived in the past. They forgot then, as the millionaire forgets today, that nature incorporates in the young about all that can be assimilated — the new generation has enough to care for that comes by heredity and necessary environment without furnishing it with a ready-made equipment for the whole of life.

In the last century this mistake became obvious and we find Rousseau answering it by attempting to require that Emilè do everything for himself. Pestalozzi laid stress upon object lessons and furnished only material for experience. Both of these were extreme reactionists. The old systems would give to the child abstract results of experience — ready-made and only requiring to be hung up as so many pictures in the mind's gallery, fastened to its walls by memory's chains. The reformers would give nothing but the stuff from which the child must wearily work out all of his own representations and symbols. Fortunately, there is here as elsewhere truth in both camps and the present tendency is to include in education any training that will enable one to meet the problems of his social relations with sense and success. First-hand experience, and much more of it than we now get, is necessary, and, reënforcing and revising it, we must have the best results of the experience of others.

Industrial training to be effective must have both these factors. Not only must the children work in shop, kitchen, sewing-room and laboratory, but as they get from these occupations serviceable habits, they must be given the study of the work of others by the investigation of the industries and arts of life. We are ready to consider as industrial training the work which the advocates of manual training bring to us, but we have not yet given sufficient attention to the meaning of the work done by such men as Mr. Thurston, of the Chicago Normal, in organizing for study typical industries. That is, we are more ready to turn over the problem to a special teacher of certain matters of technique, than we are to look into the subject we are teaching, whether geography, history or mathematics and determine its relation to industrial training. The social aspects of a subject are not very apparent when but one member of a school faculty is working at it.

The problem, then, of industrial education is to enable the student, by means of observation of and participation in the industrial life of the day with facility to form for himself a program equal to the emergencies which are sure to arise in his own industrial relations. This

is all there is to it, and yet how much of our present school work would stand this test? Before the industrial revolution, the schools could afford to spend their time on "that which profiteth not," for, while there was that much waste and loss, yet the connection between the home and society was direct and the youth could go from one to the other with reasonable certainty that the training afforded in the first would give him a footing in the second. But the child cannot enter at once into the business life of today, neither has mankind done so. The shop, the store, the factory, the warehouse, the bank, the hotel belong to "grown-up" life. They are the "grown-up" ways of getting a living. City life represents the most completely "grown-up" stage of the life of the race, and consequent upon its development has led to a removal of nearly all making from the home to the dress-maker, the baker, the shoemaker, the creamery, the waterworks, and, in flat-life, to the janitor. Even now on the farm and in the small town there is room in the blacksmith shop and around the new building for the boy to loaf and learn the elements of many industrial problems, but the city factory has a notice: "No Admittance Except on Business," and the new city building is inclosed. Look about us and see how many opportunities are there for children to get what you and I have scarcely valued in our own development because it came to us as free as air. As in economics we are concerned only with that which is limited, so there was no need for the school to take account of these processes until they should become, as they have now become, no longer free goods.

These new conditions give to the school of today, in its relations to the home and society, something of that held in logic by the middle term to the minor and major terms. We are given these two terms, home and society, and from their conditipns we must make up a middle term which will solve the problem. We are vexed, like the old logicians, with the difficulties of the undistributed middle. For this reason there is no subject better deserving of study by us as teachers than the industrial revolution, and this study, to bring us the most benefit, must not stop with the inventions of the past and the changes wrought in England by them, but it must lead directly to a study of the conditions that are present in our own community as a result of this greatest of all revolutions.

As I have suggested, there are two immediate problems: the first is that the opportunities for industrial education at the hands of the family and society are no longer free goods and for this reason the

school must furnish them; the second is that in furnishing these we must remember that any training provided must take account not only of the changes of the past, but also of those which are coming; that is, we must recognize our industrial instability. Perhaps the best statement of this phase of the problem is found in the second volume of the *American Journal of Sociology* in an article by Mrs. Florence Kelley. I will quote briefly: What is needed in the industrial training of today is a "combination of qualities which will enable (the worker) to turn with facility from one occupation to another, as each, in turn, is supplanted in the course of industrial evolution." The worker needs "not so much skill, but facility in acquiring skill and adapting one's self to the conditions of a new occupation."

The effect of the attempts to meet these problems is very evidently a tendency to unify school work. We often speak of the branches taken up for study in a school. A more careful use of language would call them not the "branches" but the "twigs" of study. If, instead of taking for granted the numerous traditional lines of school work, we would analyze some of the social conditions in which we find ourselves placed and trace these back to their elements in order to determine what the school should supply to help us meet these conditions, there would soon be a change in the school bill-of-fare.

I have become impatient many times in the past with the oft-repeated excuse which pupils, wishing to be allowed to drop a study, would bring in, "I do not need this, for I do not expect to become a teacher," but the more I have studied the matter the more I have come to agree with the judgment of the children and their parents — our schools are too largely given over to meeting the supposed needs of those who will instruct the next generation. We teach subjects whose main justification is that they may be known by those who teach after us. Such reasoning in a circle is hardly justifiable. Some states, too, provide more opportunities for the training of teachers than they do for those who wish to engage in other pursuits. I have recently been interested in the case of a young girl who earnestly wishes to become a trained nurse, but after careful investigation the only opportunity afforded by the state that is within her reach is to attend the normal school. There is no question that we need more trained teachers, but their training should include some experience with other industrial problems than school teaching, and their number should not include those who enter the profession because teaching alone stands an open door.

Professor Laughlin has recently said (*Chautauquan*, December '99): "The state, if we wish to use some of 'the social power running to waste,' ought to make it as easy for an adult or child of the unskilled class to get industrial training as to learn physics or geometry." This suggests another line of advancement upon which, here and there, a little is accomplished, enough to show at least that the state is awakening to its responsibility to a class that, in the case of many of its members, was driven out of the school by unnatural conditions found there, or was drawn out by the lack of means of subsistence to keep it there. The state is responsible not alone for the training of the children of school age, but also for furnishing opportunities for the training of those who were compelled at from ten to fifteen to plunge into the problems of the street and the factory. The inadequacy of our night schools is generally apparent. At one time I made a study of these schools in a large city—there was very little given except number and language work, and even in the latter I found one young teacher, a foreigner of university training, who could read English readily, yet compelled to prepare lessons in the book from which he had to teach, with the aid of the dictionary. A man who could read our standard authors with no difficulty and who could carry on conversation on nearly any subject with ease compelled to teach to other foreigners an English vocabulary for which he had found no use and for which his students would have no use from the standpoint either of industry or of literature.

This great middle term in present-day society, the school, is reaching out in one direction by means of the kindergarten and in another by means of extension classes, mothers' and parents' meetings, clubs, and settlements. The line is lengthening and in places there is breadth and even some depth, but the time has come in which there are arising superintendents who are "Men of the mighty days and equal to those days." (Whitman of Grant.) To them the school is a great opportunity to open up to all the doors of industry and art. They see that their responsibility is not for a part but for the whole community. It is at once objected that the community does not see this —that is one of the chief industrial problems that the educational forces must meet. We are doing better than we did in our relations to the home, we are bringing the parents to the schools, but how many of us have seriously tried to bring in the citizens? There is a difference between a parent and a citizen. Both are needed in the school. It has seemed to me in my public-school work that I had no function

that was more effective in results in the school than bringing the citizens into the schools. We can never accomplish what we desire in industrial training until we do bring this subject to the focus of consciousness of business men and women.

As you have no doubt already seen, I do not find that there is any reason for differentiating in a large part of the school life that which makes for art from that which makes for industry. Both call for participation and for observation. Both are in the kitchen, shop, laboratory, and drawing room on one hand, and in museum, store, factory, library, and art gallery on the other. The community which undertakes to train its members to meet the demands of modern life must furnish its teachers with all of these means in some form or other. In our effort to get tools into the pupils' hands, we must not forget his need for the results of others' tools, brushes and pens.

It is not necessary to have the most elaborate equipment. I felt greatly pleased last fall, when my students attended an exhibit of constructive work made by the children, to have so many who had been country- or village-school teachers remark: "Why, there is nothing here that we could not have done in our own schools." The best results that I ever saw accomplished in industrial lines were in a two-room school in a poor country district by a teacher with very little money and almost no special training.

Mr. Bennett's discussion in a recent address of the standard of work to be required of pupils is very timely. We must, as someone has said: "Exhaust the pupil but not the subject." Very often, however, we do not sufficiently regard the child's point of view and consequently undervalue his product. I am always reminded in this case of the scene in "As You Like It" in which Touchstone introduces his new-found wife, "An ill-favored thing, but mine own."

One of the greatest social values of this work comes from the fact that it brings back into the child's daily life two important factors, now too often missing in school relations. It seems unfortunate that two functions of life, which have done so much to bring about our present civilization should be the crimes of the schoolroom. I refer to communication and mutual aid. In industrial training, either from the standpoint of process or of product, these are indispensable. Then, too, the great amount of expression by means of written work — I dare not call it communication — can be reduced. When a child can be tested by a thing made instead of merely by words about it, he can accomplish better results in what writing he does do and his teachers

will have more time to spend with him in forming his style. When we learn how to use expeditions, bread-making, carpenter work and sewing as means of testing instruction, we shall all be happier and our eyes will have a chance to rest.

There is no danger that the language work will suffer. Recently in one of our western cities, a school test was held at the city market. The cooks at this place challenged the girls of the cooking school to a breakmaking contest. The school girls won. Could you have heard some of the interested parties discussing the matter before and after, you would have thought that they seldom had a subject which led them to make such effective use of language.

In reading, too, there comes much help from industrial training. There is a natural motive for reading on the subject on which the pupil is at work. Half of the new vocabulary comes to him in the natural process of the work. The coördinations are almost formed, and it is easy to complete them. The newspaper is a mine for teacher and pupils at work on industrial lines. What, if the student does find much that is untrue, will he ever be better situated to learn to read the newspaper with discrimination? Have we not a social responsibility to him in this matter? The *Scientific American*, *Popular Science Monthly*, and *Engineering Magazine* have great attractions during the grammar-school and high-school periods for those interested in industry.

Conversation is directly aided. One of the best results I have seen coming from shop and kitchen work has been that here was afforded a reasonable home study or occupation. It is a delight to follow this up and find the family circle, instead of being distracted by "new-fangled" methods of percentage or grammar, gathered together in the evening about a table, all at work on the child's loom or some other form of construction to be used in his history or nature-study recitation the next day.

Another serious problem is that which concerns food and its preparation. The social consequences of present conditions, from the standpoint alike of intemperance and waste, are greater than we dream of. It seems to me that right training here in the only social institution which we can control is our chief means of advancement. Let alone the educational value of cooking, which is very great, the social results of a generation to whom this problem has come into consciousness, are difficult to estimate. Boys, as well as girls, need this, for it is only when both heads of the home understand what this means, that

reasonable advance will be made. In some schools, as at Brookline, during two half-years in the elementary-school course the boys and the girls change work.

While I believe that, in the elementary school at least, the selection of industrial work should be made with reference to the individual pupil and not on the basis of sex, under existing conditions of equipment, school programs, prejudice, etc., the sex division must often be held to, and, even when individual needs are the first consideration, the groups show the sex line to a considerable extent. Much of the criticism that is made upon work offered for girls in our public schools would be entirely removed if teachers and training schools studied more carefully the needs of the homes of their pupils rather than the tables of the wealthy. Especially in schools in which these courses are required should there be a careful regard for simplicity and economy. The economic problems to be met in such work are those of average homes rather than of domestic service. The kitchen garden work in connection with some of our kindergarten training schools has much suggestion for us. In fact, the general home training atmosphere of many of these schools while sometimes accompanied by somewhat superficial work yet indicates a line of growth too little taken into account elsewhere.

There are many more conditions and consequences which suggest themselves but cannot be discussed here. One, however, must not be omitted. Every student finds himself in the course of time where the matter of recreation is a serious concern to him. The value of some handwork to busy members of society leads them to seek this relief, but it is soon found that a manual occupation, to be recreation to the tired brainworker, should have been learned in other than his busy adult days. The doing is a recreation, but the learning proves to be another source of mental fatigue.

After all has been said for the claims of industrial training, society offers a serious objection. A man recently read Dr. Dewey's *School and Society*, and when he returned the book to me remarked, "That can never be done, for it will cost six times what the schools today cost." When, some time ago, inquiries were sent out from a normal school regarding the equipment teachers would find in the district schools, one trustee replied, "We don't want teachers trained to use apparatus—what we want is teachers who are so trained that they can get along without apparatus." I do not believe that it pays to be radical or rash in demands—the truth is none of us have learned how

much can be done with a very little, yet when we contrast the poverty of the schools which even some of us attended with the excellent equipment found in many schools today, we know that the world has moved and therefore the world will move. Our great responsibility to society is to help it to come to consciousness of what it really needs.

Our duty lies, then, in furnishing the training which makes men and women ready to form programs as the circumstances of life arise — which gives them a stream of images which compel completion. The larger school is to take account of the actual conditions of life and enable people to meet the necessity of growth in their own lines. Workingmen contribute to the lives of thinkers and artists and so enrich them — there must be centers which carry back to the workingmen the results of thought and art. Their children and ours must be enabled to follow manual occupations and yet grow. Connections must be established between these different processes of life so that each is enriched by the others. Without industrial training the child cannot enter fully into an appreciation of industrial conditions or realize himself as a factor in the world's network of doing for others. Changed conditions bring to our generation returns from industry which it does not know how to distribute. Only as the workers of all classes awaken to the new social consciousness and possess its conscience will they be able to live the full lives that our industrial evolution demands. To bring this about is the function of the school. When its work is well done, the worker of any class, in the midst of apparent instability, will

> "Be like the bird, for a moment perched,
> On a frail branch while he sings;
> Though he feels it bend, yet he sings his song,
> For he knows that he has wings."

THE PROGRESS AND AIMS OF DOMESTIC SCIENCE IN CHICAGO.[1]

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THE teaching of cooking and sewing, for local reasons called household arts, was introduced into the Chicago public schools two and a half years ago. A special committee of five members of the Board of Education inspected at the Hammond School the teaching of these subjects which they had permitted at private expense. Twenty-five thousand dollars was appropriated for providing equipment and initiating the work for its first year. Of this but $18,50c was used. Equipments for cooking were placed in eleven schools and one has been placed in the new Dewey school. Each of these has been a centre to which several neighboring schools have sent the girls of the seventh and eighth grades for cooking lessons, one period of an hour and a half each week. The number of pupils taught at a centre averages 450. In other schools not contiguous to cooking centres, eleven teachers of sewing have given lessons of an hour and a half each week to the girls of the seventh and eighth grades, the teachers being peripatetic.

November 1, 1900, 4372 pupils were rceiving instruction in cooking and 4853 pupils in sewing, or 9225 out of a total of 13,000 girls of those grades.

Teachers are required to be high school graduates who have taken a course in domestic science in some secondary institution. This secures an able corps of teachers, several of whom have been called to more honorable and lucrative positions in other cities.

The courses of lessons in both cooking and sewing are eclectic, having been arranged by the respective associations of teachers. They have been revised and modified as experience dictated. The cooking lessons are distinctly a plain food course, lobster salad and charlotte russe omitted. Each pupil cooks the prescribed food and either eats it or carries it home. The proof of the pudding is in the eating. The success or failure of a lesson is immediately apparent. Much effort

[1] Read before the Department of Superintendence of the National Educational Association in Chicago, February 27, 1901.

has been given to securing the principal helpfulness of the lessons of the day in the home and a failure is analyzed and perplexities dissolved. The grade teachers have often wisely correlated with cooking, physiology, nature study, and some topics of practical arithmetic.

Instruction in sewing is similarly practical. A study of the nature of cloth is succeeded by the various processes of its adaptation to clothing. Finally simple garments are made by the pupil for her own use. The related subjects of invention, growth and manufacture of cloth materials, fibers and fabrics, good taste in dressing, shopping, and laundering are developed.

Sociologically considered the church industrial schools have been vastly improved upon and placed in the public school, where not simply the *poor, good* girl is taught sewing but *every* girl in the schoolroom, rich or poor, open minded or clam-like.

The cost of domestic science is $1.81 per pupil per year; the cost of manual training is $3.34; the cost of German is $4.86; this is based upon the average for the past year. These figures are significant either for comparison with other studies or with domestic studies in other cities. The salaries of teachers of cooking and sewing in Chicago are the same as those of grade teachers, ranging from $500 the first year to $900 for the tenth year. Much of the success of the teaching of cooking depends, of course, upon the method. It is distinctly a laboratory subject and like all other laboratory work is vastly superior when individual equipment is supplied. Hence we have the individual sets of dishes and a stove for each pupil. By using small portions, when they suffice the expense for material is inconsiderable, even with individual instruction. One and one fourth cents per pupil per week is the allowance in Chicago. While individual desires will ever increase the cost of equipment it is possible and wise to equip for the teaching of cooking upon just as accurate and scientific principles and practical use at the expense of $150 for a class of 24 as at the rate of $500.

One of the noblest movements of the present day is that which would magnify home. The chair, bright light, and gorgeous embellishments are a more harmful element to the saloon than its alcohol. If the honest arts of the home be made less irksome, because they are better understood, and more attractive because they are more artistic we shall have come at the root of this matter. The evening meal of the factory hand may be more tempting than the lunch counter, and the clothing of the family as well as the arrangement and tidiness of the living room at home may be as attractive as the gilded home of

vice. Domestic science may become the most unsuspected and not the least efficient enemy of the saloon.

Instruction in cooking in Chicago is well amplified in its scientific relations. The simple biology of yeast and vinegar is developed. A careful classification of food values as fats, proteids, carbo-hydrates, mineral matter etc., accompanies the study of the composition of the human body and its food requisites. The dietetic principles of suitable proportions of these food elements is given and the complementary nature of certain foods shown. The reasons for the use of hot or cold water, the relative merits of boiling or baking, of the raw and cooked states, of acid and base; such scientific data adapted to the age and knowledge of pupils enter into cooking lessons and furnish the science to enrich the household art. The dealing with material things introduces elements of accuracy and order not found in the strictly intellectual subjects. Just as in all forms of manual training, small groups of muscles are coördinated and deft manipulations mastered, thus realizing complete and extended reactions.

The useful hints, skilled methods and adept ways acquired by the teachers in their special training are imparted in turn to the pupils and as in all education the experience of the race is placed at the disposal of the child. The girl, accustomed to black bread and beer for dinner, to poorly cooked food wastefully used, learns to prepare palatable dishes from economical materials. It is difficult to measure the beneficent practical value of domestic science in these humble homes. It is a theme for eloquence and insures permanency to the subject of study no matter how much it may be temporarily buffeted about as a fad. To the girl of luxury with servants at home whose life may be distinctly social, frivolous and gay, domestic science yields an appropriate sense of the importance of the human body, its nourishment and clothing, thus introducing a more harmonious and reasonable life. In the wealthier school districts of Chicago domestic science has been as welcome to the girls as in the districts of humbler homes.

It has never been seriously charged or believed that domestic science demeans the course of study or is a preparation for domestics. We teach cooking and sewing at the age when pupils unconsciously learn that honest toil is not disgraceful. Mrs. Richards found in Boston that fourth-grade pupils gladly received lessons in scrubbing and cleaning which older girls disdained.

The impotency of the woman who says she cannot sew on a button or mend a rent is a disease peculiar to modern urban life. The young

bridegroom may profess to the wife who forgets to salt her first oatmeal that he likes the oatmeal very much better that way, but sentiment does not blossom freely from a ground of indigestion.

Aside from the general effects of domestic-science training its specific effect upon every third or fourth girl of distinctly motor predominance is marked and extremely salutary. Every teacher of manual training, cooking or sewing will bear witness to the aptitude of certain otherwise backward pupils in those studies which involve the more extended motor reactions. The course of study is thus flexibly adapted to the predominant activity of the pupil.

The teaching of sewing and cooking may be considered again in the light of school occupations. While they train hand and eye there is ever present a directing mind having in view a distinct end: "I made this loaf of bread." "I planned and sewed my own dress." The peculiar advantage of cooking and sewing as school occupations is that they each parallel practical arts at home. The home is the practice department for the lessons of domestic science. No need can be more evident than that of food and clothing. It springs from a fundamental instinct. Few desires are more strong than to be well fed and well clothed. Reason gives as a secondary basis the desire for long life and a life of bodily comfort. Theoretically this gives us a most substantial basis for interest. Practically it proves a true basis, for pupils of cooking and sewing in Chicago never ask to be excused from these studies because they dislike them. There is increasing call for the introduction of these studies in the schools which do not now have them. Despite the disadvantages of being compelled to walk a long distance from the home school once a week in variable weather, the girls who study cooking are enthusiastic and regular in their attendance, although the subject is quasi-optional and no other subject compels such travel. The interest is sufficient to overcome all reluctance to preparing material and cleaning of utensils. An interest in digestion becomes an all-around satisfied interest when the pupil actually cooks and eats and comfortably assimilates the food of which she has just been studying in her physiology.

Domestic science is an integral part of any scheme of sound correlation. If the school of the future does not bend all subjects into a mechanical circle of correlation it will certainly harmonize subjects, multiply interrelations and remove many of the present partitions. It will find its basis of interest largely in the occupations. Cooking and sewing are occupations closely related to the life of woman.

The objection to special teachers for special subjects, so-called, whether German or Latin, manual training or cooking, singing or drawing, is overcome in the face of the diversity of modern life. With the great variety of specialists in the medical profession, for example, can it be reasonably demanded that there shall be but one kind of teacher?

A very considerable portion of the business world is occupied in supplying the food and clothing for mankind. Hence the relation of domestic science to the economics of the world. Scientists inform us man does not live as long as he might in comparison with the life of animals. The relation of mal-nutrition and indigestion to the harmful effects of foods and to the shortness of human life is clear. The theory may be boldly stated that if man ate wisely appropriate food he would live longer and more happily. It is the aim of teachers of domestic science to teach and bring into practical use knowledge of proper food and the best methods of preparation.

Domestic science has been styled a fad by a certain portion of the public, along with drawing, music, physical culture, manual training, and German, and has endured with them the storm and stress period in Chicago. One week ago the board of education raised the salaries of teachers of Chicago, as one expressed it, "scraping together" all the money they could for the teachers. At the same time they scraped off two months of the term of domestic science, providing this year for only eight months' instruction. The most helpful sign of the progress of domestic science in Chicago is the increasing interest of the subject among teachers and principals and especially among the pupils. It is easy to predict that another generation will take a more generous interest and largely increase the teaching of the subject.

AN EXPERIMENT IN TEACHING TRADES AT PUBLIC EXPENSE.

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THE object of this paper is to show the need of a school in which there is the teaching of trades at public expense, and to outline a school which is attempting to put this idea into practice. No one will deny that there is a demand for trained mechanics in the United States. No nation is so blessed as ours as regards agriculture, commerce, and manufactures. We lead the world in all except commerce; we are the wealthiest people in the world, partly for the reason that we have an abundance of natural resources, and partly because we had as our early settlers men of great vigor and resources. All young nations having the great advantage of plenty of raw materials are enabled to advance rapidly in special directions. South Africa has her gold fields; Australia, her grazing lands; and the United States, her coal and iron fields, forests, plains, and immense water-power facilities.

As a nation increases in wealth and productive ability, its natural resources are reduced, and more dependence has to be placed upon an economic use of its natural gifts, and especial attention paid to the best possible use of means at hand. The older the nation, the more congested becomes the population of the cities, the more idleness increases, the more prisons and asylums are established, and the greater becomes the question how these people shall live intelligently and support themselves. The progress of civilization makes it necessary to redouble our efforts, if we are to hold our own. No one will question that the American youth ought to receive in the public schools the best possible preparation for right living. The indolent and criminal individuals come from the classes which have never fairly secured an industrial hold on the community. The unprecedented growth of our population, its rapid concentration into towns and cities, the profound changes in our social and industrial conditions, and the enormously increased facilities for intercourse with other nations have laid great duties upon the present generation. We are participating in world-wide competition, and if the nation is to satisfy its ambitions, meet its required privileges, it must be equipped with every resource

which education can supply. That we are not indifferent to foreign trade is evident from recent developments in politics; but, much as we desire to obtain it, we can never succeed except by sending superior articles at low prices and made by skilled workmen. We attempt to hold our own markets by high tariff, but articles "made in Germany" do creep in and successfully compete with home products. If we are to compete with cheaper labor and yet maintain our higher wages and better standards of living, we must make this difference of wages good by applying a higher order of intelligence to our work and get a resulting product which is efficient and cheap.

The past thirty-five years show great advancement in the education of engineers, architects, and designers. It is just as evident that the foremen and mechanics in the ranks have not advanced in their work, and do not have their former skill. The advancements made in manufacture and use of machinery, improved methods in transacting business, different standards of living, have all tended to bring about a most radical change in the character of the work demanded and in the ability and intelligence of the workmen. In industry all things are becoming new, and a new method for preparing young men for their life-work must be initiated with foresight and established with liberality.

There are a number of schools in the United States which train men for technical pursuits. Some schools train men primarily along the theoretical lines, and some in both theory and practice. There is, however, a constant tendency for the lower-grade schools, and schools in which shop practice predominates, to become higher technical schools by imperceptible advancement. Let me enumerate three different types of technical schools in the country, each of which attempts to guide a young man into his right career.

There are, first, the higher technical schools, where engineering branches are studied, with more or less work in the shops. The aim of these schools is to furnish graduates fitted to carry on engineering work, to be draughtsmen, engineers, and designers; in other words, to train men able to direct in the solution of the great engineering problems always arising in a new country in overcoming natural conditions, and later in overcoming conditions which are the results of civilization. I will not say that there is no demand for such men, but I will state that there is a diminishing field for the consulting-engineer type because of the aggregation of capital which brings about the economics which are the result of large amounts of output. There is

a lessened demand for highly trained men such as consulting engineers; there is more demand for engineers and superintendents who have the requisite caliber and competence to have charge of the various departments of production, and the greatest demand for artisans who have been systematically trained and taught.

The technical schools are not as available for the working classes as those in Germany, France, and Switzerland. The working classes have little to complain regarding education, except that it does not have a strong enough or a close enough relation to the industries which the working class pursues. The higher technical education is beyond the reach of the masses. The practical essentials ought to be within their reach.

Secondly, there are the manual-training high schools, mechanic arts high schools, and schools of like character, supported partly or wholly at public expense. These schools usually require for entrance an elementary training of at least eight years' duration; and for graduation, the successful completion of a course of study covering from three to four years. These young men pursue academic work of high-school grade, together with about equal time of shopwork and drawing. The work they do aims to be educational and practical, and these schools send many graduates to colleges and technical schools. The graduates of these schools usually become engineers, draughtsmen, superintendents of mills, or enter some business requiring technical knowledge, as well as executive ability.

The third class of schools are the industrial art schools, textile schools and trade schools, which are usually supported by endowments, state aid, private contributions, and paid tuitions. They are usually under the supervision of trustees and do not bear a close relation to the public schools. Such schools aim to train young men so that they can enter the ranks of labor as capable and intelligent artisans; their purpose is to give instruction to young men in certain trades, and to enable young men already in the trades to improve themselves. These schools usually receive applicants of high-school age who have a fair education —young men of good promise, clean habits, and earnest purpose. They are very popular and have a large number of applicants. Accompanying the day work is evening work along similar lines for young men already in the trade who desire to improve themselves, or young men in other lines who think they see an opportunity for advancement by learning a trade.

The technical schools and manual-training schools do not attempt

to train young men in business methods or to compete with shop practice; they usually produce very fine and exact pieces of work regardless of time and expense. The industrial schools aim to make their work very practical and to conform as far as possible with industrial life. The men engaged in teaching these trades are usually skilled mechanics who have shown especial skill in teaching, and they make every effort to teach the quickest, best, and most practical methods.

Owing to the decadence of the apprenticeship system, few opportunities are given to young men to learn a trade in a systematic and thorough manner. The result is that skilled laborers who know one trade, and who have a general training in mechanical processes, are exceedingly few. Trade unions have in the past antagonized the aspirations of young men who wish to work at a trade, and yet little restraint has been placed on the immigration of Europeans trained in skilled labor. If our mechanics are to be men of the highest skill, if they are to work intelligently, develop individually as a trade develops, they must receive special training for the work. We know that the educated and thoughtful worker produces more superior work than the uneducated worker. Under the apprenticeship system a young man working beside the master-workman was enabled to learn his trade because he was a pupil as well as a worker. It is no wonder that a young man under these conditions absorbed all the processes of the trade, and was able to see the rough materials made into finished products. Owing to division of labor, the factory is no longer a school of instruction, because most operations are carried on in such a way that it is difficult to bring to light and emphasize the fundamental principles. Without describing all the details of modern methods of manufacture, we know that industrial conditions have changed, and we know that we must meet these changes.

The progress of a workman is hampered by the necessity of keeping him employed in certain restricted lines of work, once he has acquired skill, in order that he may do his share toward making the factory profitable. The apprenticeship system has gone forever, and we must not look back with regret upon what seems the ideal conditions, but strike out into new ways. It is surely the day of specialization, the day of special training for everyone engaged in professional life; and why not a training for what are called the humbler callings of life?

The workingman's best friend is the school system; it does much to aid him in assuming the attitude of equality. It will be claimed by

many that there is an economic danger in educating mechanics; that young men so educated will force other men out; that the industrial field is full; or, in general, that there is danger of over-education. They will claim that to educate a day laborer so that he becomes a journeyman plumber, and to advance a journeyman plumber to the position of master-plumber, and so on, is simply benefiting some men at the expense of depriving others of their occupation. We must remember, however, that science is abolishing occupations at the lower end of the scale and creating new ones at the top. Where are the army of day laborers — the reapers, hod-carriers, men that were doing the purely brute part of the labor? Science is demanding whole armies of skilled workmen in the new employments of the last part of this century. Consider the new industries which have arisen in the past fifty years, requiring men to fill many new occupations, such as telegraphers, electricians, railway employés.

It never happens that laborers on a sewer thrown out of work by the introduction of the traveling cranes obtain places as electricians. They do not waste their time trying to enter one of the newly created, superior callings, but they do creep up in the scale of occupation. Intelligent occupations are being provided at the upper end of the scale, and the brute-like labor at the other end is being replaced by machinery; and undoubtedly in time there will be little left of labor that requires an uneducated laborer.

There is a growing demand on the part of the people that the public schools should fit pupils more effectually for life than they are now doing. Although this demand by the people is not recognized in many of our educational theories, it remains true that there is an ever-increasing feeling among many of our successful business and professional men that an educational system that sends its graduates into the world without the means of earning a living is lacking in a most vital respect. Not a few men are observing that present courses of study are arranged for the few who expect to attend college. Our theory must broaden to meet the times, and the public school must connect more closely with the present conditions of industrial life and with the after-life of the pupil. In estimating the value of any subject it is necessary to consider whether the training received in school will be continued in the duties of after-life.

Having attempted to show that the industrial standing of a nation will be best when the industrial training of the rank and file is best, let me point out three ways to enter upon trade teaching. First, by opening

an evening trade school as a department of the manual-training high school, making such addition to its equipment as will make it available for trade teaching. This trade department will be composed of young men who are willing to utilize their evenings in advancing themselves; young men who are at work during the day at a trade; young men not at a trade who think a change of occupation desirable; and finally of those pupils of a day manual-training high school who feel that they would like to work overtime in order to perfect themselves in a chosen trade. If the manual-training high school has practical men as teachers, these can be engaged to do this extra work. If this is not possible, then the services of intelligent mechanics can be secured as teachers. It would be well to have the instructor who is in charge of the day work supervise the night work, in order to avoid any friction. The Mechanic Arts High School, Springfield, Mass., has established an evening trade school, and later on I shall speak of it more in detail.

The second method to proceed in trade teaching is to offer trade courses in the curriculum of existing manual-training high schools. These courses would have extra shopwork in all the lines of mechanical work of each of the four years, with the fourth year devoted almost entirely to shop practice in a special line. Such a course would practically supplement the manual-training course, which aims to develop manual skill as a part of general education, by a course in shopwork, which specializes in favor of some one trade, and develops manual skill for the purpose of enabling a student to enter upon a specific occupation and earn his living.

After a student has received instruction in mathematics, science, English, and other branches of academic work, and has had fifteen hours of shop practice and drawing a week, he could easily be prepared for a trade in one or two years. The time needed to supplement his manual-training course by a course in some special line of shopwork depends largely upon the trade he wishes to pursue. Plumbing, tinsmithing, steam-fitting, blacksmithing, bricklaying, and painting are some of the trades which can be learned in a comparatively short time, while tool-making, pattern-making, and the machinists' trade require much longer time, as well as a higher degree of skill, in order to perfect one's self. The extra shopwork demanded for this course involves more or less reduction in the number of hours devoted to academic work; and to carry out the scheme some of the higher academic branches must be omitted.

It is considered necessary that the manual-training high-school work precede any trade-school work. Although this is true, it is very evident that the boys that need the trade-school work leave the elementary school before they reach the high-school grade, and thus they miss the manual-training work, to say nothing about missing the special trade work. These pupils leave school for several reasons: they may be obliged to contribute to their support, or their parents see nothing to gain in keeping them in school; or, finally, they may not have the ability to master the academic studies required for admission to the manual-training high school.

This brings me to the third course in trades. This course is for boys over fourteen years of age who are found in the various grades of our grammar schools and who would like to have a trade. These boys are at the most receptive age, and there is no better opportunity to instill into their minds those essentials of education that are so much needed.

It must be remembered that our industrial life gains the majority of its recruits from the boys that never graduate from the grammar schools, and the meager academic training, combined with lack of manual skill, results in much of the poor work and unpleasant labor conditions with which many of us are familiar. These boys could be given a course in academic work consisting largely of arithmetic, English, bookkeeping, and elementary science, combined with manual instruction. It would probably be expedient to have the academic work for half a school day and leave the remainder free for shopwork. The shopwork ought to begin with a course in sloyd a little more extensive than the present grammar-school course, and its educational value ought to be emphasized. A course in benchwork, taught from an educational standpoint, is just as essential a part of elementary instruction as "the three R's." Gradually the trade element ought to be introduced, and finally the pupil, choosing his trade, would enter upon the course of instruction prepared for that trade. Such a course for certain grammar-school boys would tempt many, who otherwise would leave school and go to work, to remain for a few years longer in the hope of ultimately earning higher wages as skilled workmen.

Large cities would require school buildings especially equipped for this work, and located in different parts of the cities, while smaller cities could utilize the manual-training school equipment and have the academic work done in the regular grammar school. Such a procedure would not entail much extra expense, as the pupils attending the trade schools would relieve, to a certain extent, the grammar schools.

A comparison between the present-day method of attempting to learn a trade in a shop and the trade-school system I have outlined shows clearly the advantages which the latter offers young men. Nowadays a young man can obtain only a very limited knowledge of a trade for he has no opportunity for learning except through observation which is a poor substitute for the skill acquired working under the direction of a master-workman. In a trade school such as I present every endeavor is made to advance the student in the trade he is learning; and by reason of the care devoted to his instruction, he readily comprehends the use of tools and becomes capable of doing work valuable to his employers. Furthermore, a young man can quickly determine whether he possesses an aptitude for a certain trade, and can readily make a change in case he has erred in his selection.

It remains to be said that no trade school can make a finished workman, as it is practically impossible for a city to equip and maintain a trade school which will imitate a first-class shop in all respects — a shop that can manufacture all kinds of machinery and attempt all lines of industrial and commercial life. It follows, then that all graduates would have to serve more or less time in a shop before they would become finished workmen.

Some will say that the teaching of one trade will necessarily involve the teaching of all trades, and the question will be asked: Where will it all end? Certainly no city can teach all trades, but they can teach the limited number of trades demanded for that city. The city of Springfield received calls for teaching four trades, namely, tool making, machine-shop practice, plumbing, and pattern-making. Large cities like New York, Chicago, and Boston would need to provide instruction in several more trades.

To present the matter more definitely, I will give in some detail the experiment tried in Springfield, Mass., of teaching trades at public expense. One of the most interesting, satisfactory, and practical developments of the Springfield schools in the last few years has been in the way of evening schools. The large number attending the evening high school showed conclusively a strong appreciation on the part of the public of the opportunities given for general education. The evening drawing school has been very well attended for many years, and it only remained to round out the educational facilities to those anxious to improve their opportunities by establishing an evening school of trades.

Springfield is most fortunate in having a large number of different

manufacturing interests which require skilled labor. The United States Armory is located here, and this industry requires many skilled men.

In the fall of 1899 the school committee decided to open evening classes in trades in connection with the Mechanic Arts High School, and, as a result, classes have been organized in pattern-making, plumbing, tool-making, and machine-shop practice. The instruction is free to residents of the city, a small charge being made for incidentals. The school has a machine-shop equipment which will accommodate a class of forty in two sections, and about the same number can be accommodated in the plumbing classes. The first year there were eighty-seven applicants for the tool-making classes and about fifty for the plumbing. Twenty-four manufacturing interests were represented in these classes. Personal questioning of the men brought out several interesting facts. One man said that he had been working at a drill for fourteen years and knew nothing of any other machine; another had worked about as long on a shaper; another had been drilling on the same part of rifles for eight years.

These few illustrations only show that the average shop affords little opportunity for a man to learn to operate other machines than those to which he has been assigned. The men all agreed that the rigid rules of many of our larger factories, the division of labor, the piece-work system, all tended to narrow their sphere of activity. The so-called ignorance of workmen, the inability they possess readily to change their particular line of work when they are thrown out of employment, is not due to a want of desire to learn, but to a lack of opportunities to improve themselves.

It may be interesting to note the ages, occupations, and previous academic training of the applicants of the first year. The statistics regarding ages are valuable because they show that the majority of the applicants were young men, unmarried, of responsible age, self-supporting, and consequently they offer the best material. The ages of the tool-making applicants were classed under four heads:

The ages of	10	per cent.	of the	men	ranged	from	15	to 20	years.
"	"	45	"	"	"	"	"	20 to 25	"
"	"	20	"	"	"	"	"	25 to 30	"
"	"	25	"	"	"	"	"	30 to 40	"

In the plumbing classes the ages of the applicants were as follows:

24	per cent.	of the	men	were	from	15	to 20	years	of age.
46	"	"	"	"	"	20	to 25	"	"
14	"	"	"	"	"	25	to 30	"	"
16	"	"	"	"	"	30	to 40	"	"

The statistics regarding the occupation of the tool-making applicants were classed for convenience under six heads, as follows: 7 per cent. of the men were laborers, 23 per cent. ordinary mechanics, 55 per cent. machinists, 7 per cent. clerks, 8 per cent. miscellaneous.

The occupations of the plumbing applicants were classed as follows: 12 per cent. of the men were laborers, 16 per cent. mechanics, 10 per cent. master-plumbers, 12 per cent. journeymen plumbers, 44 per cent. helpers, 6 per cent. miscellaneous.

The statistics of occupation show that the majority of the men were endeavoring to improve their skill and broaden their knowledge of their chosen trade, and that a few laborers and clerks believed that a change of occupation would be desirable for them. The fact that master-plumbers chose the course testifies to the high order of the instruction. The previous educational training of the classes in tool-making was superior to that of the plumbing classes, as shown in the following statistics:

EDUCATION OF THE TOOL-MAKING CLASS.

7	per cent.	left	school	in the	sixth grade.
25	"	"	"	"	seventh "
15	"	"	"	"	eighth "
18	"	"	"	"	ninth "
35	"	"	"	"	high-school grade.

EDUCATION OF THE PLUMBING CLASS.

6	per cent.	left	school	in the	sixth grade.
36	"	"	"	"	seventh "
16	"	"	"	"	eighth "
26	"	"	"	"	ninth "
16	"	"	"	"	high-school grade.

The figures show that a large percentage of the boys leave school at the seventh grade to learn a trade, and consequently they are thrown upon their own resources with little elementary training, and I surmise that many would have staid in school a few years longer if they could have had the opportunity of supplementing their academic work by some course in the trades, such as I have presented.

It is needless to state that the applicants of all the classes have proved to be thoroughly in earnest. The course in tool-making requires some previous knowledge of machine work and mechanical drawing. The qualifications to enter the plumbing and pattern-making classes are merely proper age and earnestness. The tool-making

and machine-shop practice class is divided into two sections each of which meets two evenings a week for a period of six months. The other classes meet three evenings a week.

The equipment of the machine shop consists of ten lathes, one planer, two shapers, two universal milling machines, two universal grinders, one upright drill, one sensitive drill, the necessary benches, small tools, etc. In general, the equipment is equal to that of the average manual-training high school. The plumbing equipment is complete in all respects. This equipment is not expensive, as almost every student possesses a kit of tools which he uses at his trade. The pattern-making equipment is similar to that of any manual-training high school. The instructor in machine-shop practice in the day school, having been employed as the designer in charge of experimental work for a large manufacturing concern and consequently fully competent to devise a course of instruction suited to the needs of the men, has been placed in charge of these classes. The school is fortunate in securing as assistant instructor one holding a superintendent's position in a machine shop where modern methods prevail. The instructor of plumbing is well fitted by education and experience to develop the department of plumbing. The fact that he is city inspector of plumbing gives weight and value to the quality of his instruction. The school is equally fortunate in having a very superior instructor of pattern-making who thoroughly appreciates the nature of a course in woodwork required for evening classes. The courses in machine-shop practice and tool-making cover three years, while the courses in plumbing and pattern-making are completed in two years. Certificates of proficiency are given at the expiration of each year, and it is probable that a diploma will be given at the successful completion of each course of study.

Each member of the metal-working classes was required to purchase the following tools: one scale, one outside spring calipers, one inside spring calipers, one pair of dividers and a center gauge. It is also suggested that he furnish a micrometer and a square. The course of instruction embraces the following exercises: mandrils, chucking drills and reamers, lathe centers, V blocks, parallels, milling cutters, cylindrical gauges, taps and dies, counterbores, punches and dies. The advanced work consists of exercises in making special tools — such as drill jigs, bench centers, fixtures for taper turning, surface plates, physical and electrical apparatus. Special instruction is given in the various processes used in hardening and tempering steel. Practical talks on

the manufacture of iron and steel, modern machine shop methods, file-cutting, etc., are given occasionally by men of experience. It is recommended that all members of these classes join one of the classes in mechanical drawing.

The course in plumbing is divided into two portions: theory of plumbing practice and manual instruction. This course has already been referred to in a previous issue of this MAGAZINE. The course in pattern-making needs no outlining.

The evening school of trades is apparently very successful in point of interest and in the quality of the work done; and at the present time, the third year of its existence, it is demonstrating its value to the students and to the public at large. Many articles of value made by the students have been added to the permanent equipment of the school.

In conclusion, I will state that in the course of instruction as outlined for the Mechanic Arts High School there is a special course which approaches a course in trade teaching. This course differs from the evening work in that academic instruction is given; considerable attention being paid to the essentials of English, mathematics, science and history; and an unusual amount of time is alloted to mechanic-arts practice. It is universally conceded that the time given to mechanical work in this course will have to be largely increased, without infringing upon the academic work, in order to give the necessary thoroughness to the teaching required for the trades. It appears that the students of a trade course ought to work at least in the last two years of that course, eight hours a day. As yet no provision has been made for strengthening the course in shopwork in the grammar grades and adapting it to the needs of the boys who never reach the high school.

AN EXPERIMENT IN WOOD-TURNING.

Charles A. Bennett.

During the past fourteen years nearly every teacher of wood-turning in the United States has been paying silent tribute to the excellence of the course developed by Mr. Charles F. White, under the guidance of Dr. C. M. Woodward, at the St. Louis Manual Training School. This course appeared in 1887 in Dr. Woodward's book, *The Manual Training School*, and was the first manual-training course in wood-turning published in this country. It immediately took its place as the standard course, with which others were compared, and from which others were derived. That its influence is so potent today is proof of the quality of Mr. White's analysis of the processes of wood-turning.

Recognizing the value of the St. Louis course, however, does not imply any lack of appreciation of the improved courses which have been worked out since that was published. We do not overlook the course planned by Mr. B. F. Eddy, of Boston, and published in 1893 by the State of Massachusetts in a report on manual training and industrial education; nor the one arranged by Mr. George B. Kilbon and published in the same report. Neither do we forget the course developed later at Pratt Institute under Professor Charles R. Richards. These, with many others that might be mentioned, would prove that progress has been made in wood-turning courses during the past decade, but, beyond the introduction of more useful articles, there have been but few notable departures from the course developed by Mr. White. Indeed, it is surprising on comparing courses, to see how few changes have been made in the forms turned and in the methods of appealing to students. But with the application of some of the newer ideas coming into the teaching of manual training one may reasonably conclude that there will come more vital changes in wood-turning courses in the near future. This being the case every new departure is of interest.

The experiment which is described in this article was performed at Bradley Polytechnic Institute during the spring of 1900. It is published here, not because it presents conclusive evidence, but because it was interesting and profitable to us, and we believe that it may be

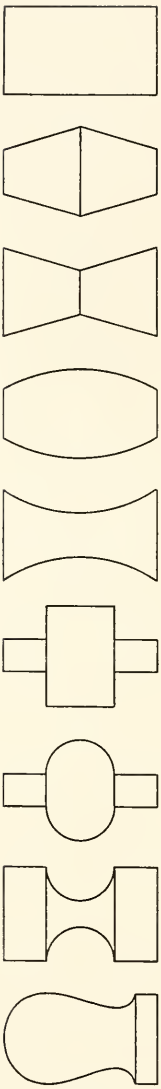


FIG. 1.

suggestive to others. The experiment was governed by beliefs which may be expressed in the following propositions:

We believe (1) that manual training and freehand drawing should be more closely connected than is usual in manual-training work; (2) that wood-turning may profitably be accompanied by a systematic study of the typical forms employed in turned objects; (3) that in a much larger degree than is usual should the development of feeling for proportion and curvature be one of the aims in teaching wood-turning; (4) that there is no better time to teach fundamental principles of designing for wood-turning than when pupils are pursuing a course of tool-work in wood-turning; (5) that growth of power in designing begets interest and stimulates to effort, not only in designing, but in turning; (6) that it is possible to teach a class in wood-turning in accordance with the above propositions without departing materially from the fundamentals which, in the past, have made wood-turning valuable as a manual-training subject; (7) that, if this can be done, the educational value of the wood-turning will certainly be increased; (8)that such a plan of work would offer greater range than usual for individual effort and individual initiative, thus involving an approach more nearly to the ideal conditions for self-expression.

The conditions under which the experiment was performed may be stated as follows: We had a class of about sixty boys in first-year woodworking and drawing. These came to us in three sections, thus allowing three different courses of work to be carried on in the same shop by the same teacher under conditions as nearly identical as is possible with different boys. When the question arose as to the desirability of making some changes in the course of instruction, the teacher of the class, Mr. Clinton S. Van Deusen, spent a long evening with me in conference. First we enumerated the defects in our course

as it then existed, and discussed them from various points of view, suggesting possible improvements. Next we made an analysis of our course in spindle-turning from the point of view of the tool processes involved. This we recorded in the form of simple sketches on the corner of a sheet of paper. After making one or two changes our analysis appeared as in Fig. 1. This modified analysis suggested, so far as tool manipulation is concerned, the elements which we thought desirable to weave into any new course or plan of work we might choose to arrange.

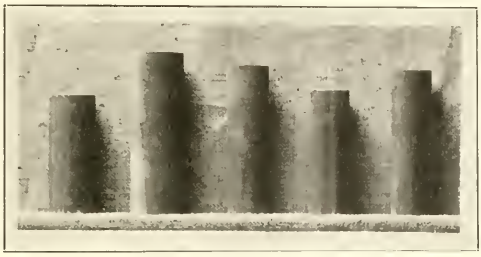


FIG. 2.

After further discussion we decided to give our old course without change to one section of the class; to another section we would give a modified course following the new analysis, and involving less repetition in some of the fundamental exercise pieces. In general the diameters of these pieces would be increased about 40 per cent. Both this and the old course included useful articles in addition to exercise pieces. For the third section we decided to arrange work in accordance with the eight propositions already stated. Each piece turned in this section was to be designed by the pupil himself in the time allowed for drawing.

When the class assembled for the first lesson in designing, the teacher called the attention of the pupils to several vases, cylindrical in form, which were appropriate for holding flowers. The proportions of these vases with reference to the shapes of the bunches which might properly be placed in them were briefly discussed and each pupil was asked to draw the front view of a vase to hold a bunch of narcissus or other tall flowers which was suggested by a rough sketch made on the blackboard by the teacher. The greatest diameter in the drawings of these vases was not to exceed two and five eighths inches, as we wished to turn the forms out of three-inch square gum-wood; pupils were encouraged to think of these drawings as scale drawings of the real vases they were designing. After the drawings had been completed and approved, they were taken to the shop, and each boy turned his

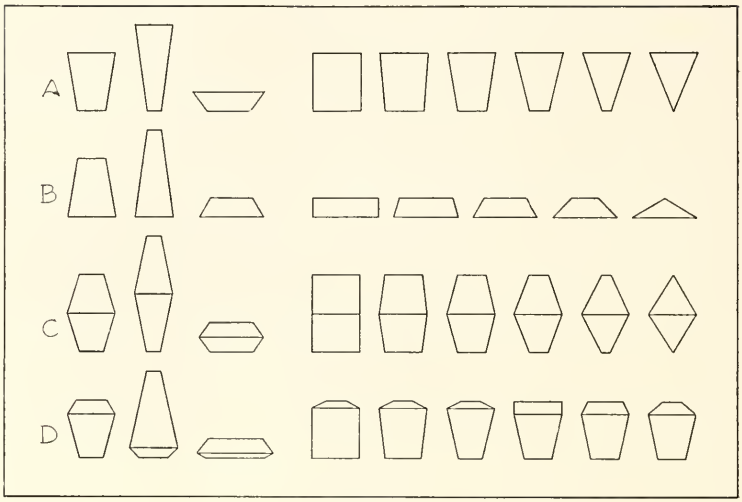


FIG. 3.

first cylinder from his design of a cylindrical vase. Five typical ones are shown in Fig. 2. No attempt was made to hollow out the inside, making actual vases.

When the class met for the second lesson in designing, they were shown the chart reproduced in Fig. 3. Their attention was called to the top line of figures marked A. These represent the front views of objects of revolution whose forms are employed in a variety of utensils. The first three show how changing the principal proportions of an object changes its appearance and its usefulness. The others suggest how to change the character of a form by changing the angle between the sides and top. Having observed these facts and seen them illustrated in a variety of dishes, cups, and the like, in the hands of the teacher, each pupil proceeded to design a tumbler. While designing it he was to ask himself the questions: Will it tip over too easily? Can it be held easily in the hand and without spilling its contents? Does it look well? Fig. 4 shows a few of the wooden pieces turned from these designs. These, and the same is true of each of the other groups of turned pieces shown in illustrations, were selected to show the range rather than the quality of the forms produced.

The third lesson was similar to the second, being to design a

flowerpot. This gave opportunity for combining cylindrical and conical parts in one design, but, as we found, it also gave us a problem in turning — working up into a corner — which was a little too difficult at this point in the course.

At the beginning of the fourth lesson the pupil's attention was called to the three lower lines of figures on the chart, Fig. 3, and then shown a Japanese vase, in form consisting of two frustrums of cones base to base. To improve upon the design of this vase with reference to proportion was the problem given. Five typical pieces resulting are shown in Fig. 4. The fifth lesson was to design a vase with neck, involving only cylindrical and conical forms, or merely the latter. The results were fairly satisfactory from the viewpoint of tool-manipulation, but otherwise decidedly unsatisfactory.

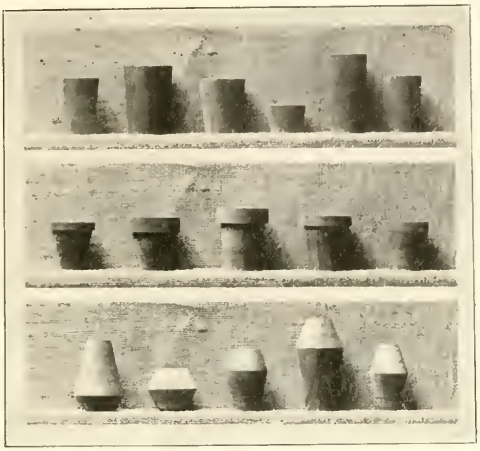


FIG. 4.

In beginning the study of curved forms, Chart No. 2, Fig. 5, was shown. From this they saw how it is possible to develop a great variety of forms from such objects as the ellipsoid, the ovoid and the echinus. They also began to appreciate how slight a modification in proportion and curvature is necessary to produce a marked change in the character of an object. Each pupil was then asked to select the form that he liked best, merely as a pleasing form, and without reference to its practical utility. In this, an effort was made to get the pupils to feel as well as to see the differences betwixt the various forms represented on the chart. Then each pupil was asked to draw on his paper a vase without neck or base, of the same general character, but which he liked better. In order to help him to verify his choice of proportions the device shown in Fig. 6 was adopted. A piece of cheap bond

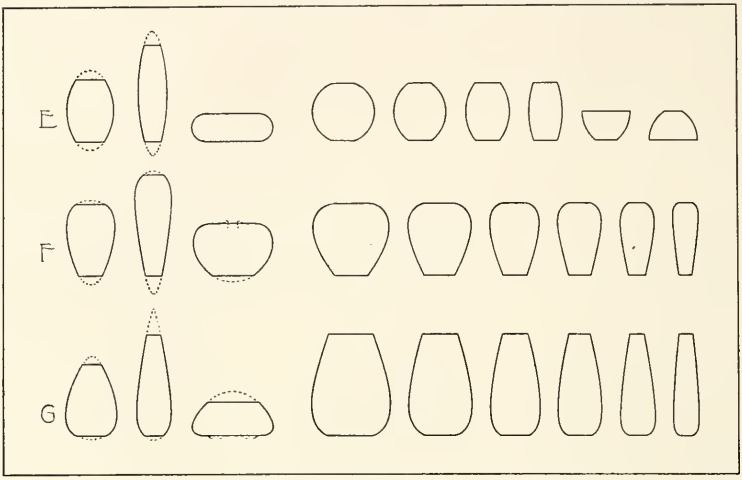


FIG. 5

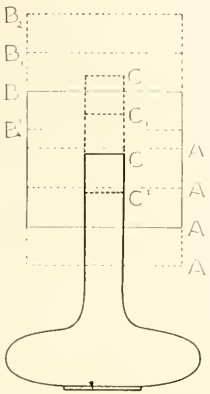
paper, A B, was placed on the drawing as shown. The part of the vase under the bond paper was traced on that paper, and then the paper moved slowly back and forth in a horizontal direction. It was first moved to the right, as to C_2, until the vase appeared to be too wide to be of pleasing proportions; then to the left, as to C^1, until it was too narrow. This process was continued, each time narrowing the limits, until a point, as C, was decided upon in which position a more satisfactory vase was shown than in any other. The pupil then corrected his drawing in accordance with this decision. Sometimes a piece of sketch paper was used instead of the bond paper, in which case half of the vase was drawn on the sketch paper.

The next lesson was similar, the difference being in the fact that each pupil was allowed to add to his vase some simple form of base or neck or both if he pleased. The six wooden vase forms shown in Fig. 7 were turned from the designs of these two lessons, and are fairly representative of the work of the whole class.

The study of concave forms was begun by the teacher making on the blackboard a series of sketches of such forms as are shown in Fig. 8. After a brief discussion of these, in which attention was called to the fact that these forms could be produced by using the same curves that were used in Fig. 5, a small Japanese vase belonging to this class of forms was produced, and each pupil was requested to improve on

the design of that if possible. Fig. 9 shows four of the resulting pieces.

The study of compound curves began with designing a long-necked vase. In connection with this the device shown in Fig. 6 was used to assist in determining the length of the neck. Fig. 7 suggests the variety of forms produced.



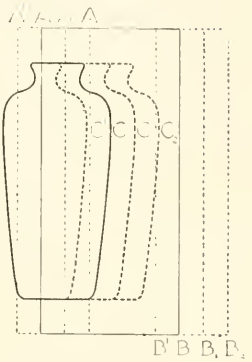


Fig. 6.

Then followed the designing and turning of larger vases in which the greatest freedom was allowed as to choice of form. The end of the term was so near at hand that many of the designs for these vases were not worked out. A few of these large vases were finished in color — yellow, green, red.

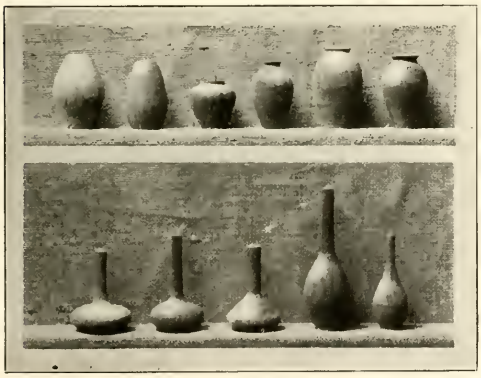


Fig. 7.

The last problem was to make a candlestick out of a piece of cherry and finish it in the natural color. This involved designing, spindle turning, face-plate turning, fitting, and polishing in the lathe. In preparation for this problem a class study was made of the principles underlying the joining of curves as set forth by Henri Mayeux in his book, *Decorative Composition*. Only a very few students had time to complete these candlesticks.

While this work had been going on in the third section of the

class the other two sections had been following the plans decided upon at the beginning of the experiment. Our conclusions with reference to the work of the three sections were as follows:

1. That the modified course, made up of models larger in diameter and containing fewer immediate repetitions of fundamental operations, which was given to the second section of the class was better than the old course which was given to the first section.

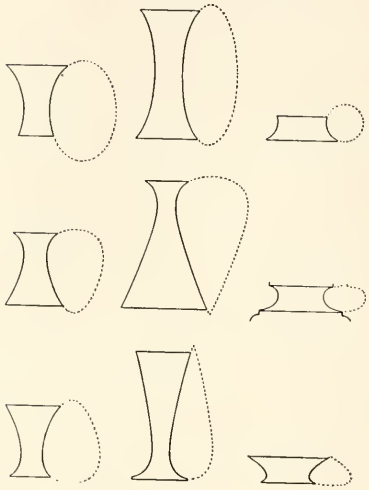


FIG. 8.

2. That, on the whole, the plan of work followed in the third section was the best of the three. In this connection it should be stated that at the beginning of the experiment the teacher of the class was in favor of the modified course given to the second section. He did not believe that the boys of the third section would be able to use their tools as well at the end of the course as would the boys of the other two sections. At the end of the experiment, however, he said he could see no difference in this respect between the boys of the second and third sections. He also stated that the boys of the third section had manifested greater interest in their work, and had shown a higher appreciation of proportion and curvature. In short, they had lost little and gained much by following the new plan. If there had been any loss, the teacher said, it was in ability to turn curves of short radius, and this loss was much more than offset by gains in other directions.

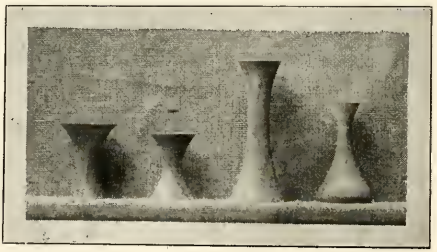


FIG. 9.

3. That the results justify us in making an attempt to develop the new plan further, connecting it more closely with the social interests of the pupils.

BIRCHES ALONG GÖTA CANAL, SWEDEN.

LEAF FORMS OF OUR COMMON BROAD-LEAVED TREES. IV.

EDWIN W. FOSTER,
Manual Training High School, Brooklyn, New York.

One passes the subject of maples with regret, only to discover that other families are equally interesting. For instance, who can think of New England without its elms? It would, indeed, be a different country. The elm might be said to typify New England character—dignified, sturdy, graceful, and refined. The habit of the tree, being tall with foliage well up, gives the desired shade, yet does not obstruct the view, while its grace and stately dignity give an air of comfort and distinction to the grounds which it seems to protect. Its wood is valuable for certain kinds of work, being tough and strong, but is not suitable for cabinet work, being difficult to polish. It is used considerably for wheel-hubs and in cooperage work.

Observe the edge of the elm leaf carefully. The teeth not only curve gracefully toward the extreme tip of the leaf, but they are themselves toothed, a form known scientifically as "double serrate." The

AMERICAN ELM.
FIG. 8.

texture of the leaf is coarse and extremely rough to the touch, in marked contrast to the birch family, whose leaves superficially it resembles.

There are nine members of the birch family, all of which are beautiful trees, with delicate foliage and fine close-grained wood which, in most cases, takes a high polish.

The elm might be called the tree of civilization, and the birch its wild cousin; but the wild cousin stands taming very well and is worthy of the prominent place generally given it in our parks and lawns. If the black birch with its aromatic bark is not known to a boy, the white or canoe birch is sure to be, for it seems to be the fate of this beautiful tree to be disfigured by every roaming youth who has strength enough to tear off strips of its paper-like bark. It is a rare thing to find one of these trees which has not been touched by the hand of boy.

The leaf of the black or sugar birch may be distinguished from the elm by its smoothness and thinness, by its slightly cordate base, its taste, and the fact that it grows in pairs instead of singly. Its edges

AMERICAN BEECH

FIG 9

BLACK BIRCH

are double serrate, but the curve of the teeth is not nearly so pronounced as in the elm.

The red birch has a much smaller leaf, of a very different character, as shown in the sketch. This species loves the water and reaches its greatest development in the swamps of Louisiana and Texas.

The famous white, paper, or canoe birch has a leaf somewhat broader than the black variety, but without the cordate base. Its bark is the distinguishing feature and can never be mistaken. It comes off in layers, and possesses a resinous quality which makes it impervious to water, a fact fully appreciated by the Indians who constructed their canoes of it.

A smaller tree, known as the gray or white birch, also has a white bark, but it is not as perfect as the canoe bark, does not peel in layers, and has peculiar triangular black spots on the trunk beneath every limb. It loves barren, rocky places, abandoned farms, etc., and is sometimes called old field birch; but it has a glorious, delicate foliage which cannot be duplicated in the forest. Each leaf swings from a long slender stem, the general habit is drooping, almost to the weeping form, and the aspen-like effect is heightened by every passing breeze which gives a shimmering impression as of green fire. The leaf-form is very odd: a broad, flat base, and then a long, graceful taper out to an unusually fine point, the whole edge being finely double-toothed.

The differences in the leaf-forms of the birch and beech are very marked. Both have toothed edges, but in the beech the spaces between the teeth are so remarkably shallow that one has to search for them.

The sketch indicates this point better than any written description. The edge of the beech leaf is really that of the chestnut in miniature. In the European variety common in our parks the indentations have practically disappeared, leaving simply a waving effect. The most popular variety of this family is undoubtedly the purple or copper beech, so called from the beautiful, dark-red foliage now so prominent a feature in our landscape gardening. There has been a common belief for generations that the beech is proof against lightning, and recent scientific experiments would seem to verify the statement to a marked degree, as beech-wood offers considerably greater resistance to the electric current than oak, poplar, or willow. The wood is hard, strong, and tough, and is susceptible of a high polish.

FIG 11

GRAY BIRCH

Closely related to the beeches and birches are two little trees which have delicate birch-like foliage and wood of great hardness — the hornbeam or blue beech, and the hop-hornbeam or ironwood.

The leaves of these two varieties are quite similar, that of the ironwood being slightly the larger. The name "hop-hornbeam" is derived from the fruit, which resembles the hop; and the name "ironwood" from the great strength and hardness of the wood. Both are slow-growing little trees, and their nature may best be understood by a quotation from Harriet L. Keeler's excellent work:

The Horne bound tree is a tough kind of wood that requires so much paines in riving as is almost incredible, being the best for to make bolles and dishes, not being subject to cracke or leake.—(*New England's Prospect.*)

ASSOCIATIONS.

DEPARTMENT OF SUPERINTENDENCE.

THE annual meeting of the Department of Superintendence of the National Educational Association was held in Chicago on February 26 to 28. The meeting of this department is coming to be one of the great educational gatherings of the year, and is attended not only by superintendents of schools and presidents of normal schools, but by supervisors and experts in nearly every line of school work. In connection with the meeting this year there was a session of the National Herbart Society, and on two of the days there was held at The University of Chicago the second annual meeting of the Association of American Universities. The unprecedented growth of this mid-winter gathering is due largely, no doubt, to the place of meeting. In Chicago there is always some new educational thing to see or to talk about, and certainly there is no other city in the country that can offer equal accommodations for such a meeting. The Fine Arts Building with its University Hall, Studebaker Theater, club rooms, and offices; the Auditorium Hotel with its lobby and spacious reception rooms, parlors, banquet halls, and Annex; all these under one roof, as it were, furnish accommodations almost ideal.

The program began on Tuesday morning at 9:30 with an address by Superintendent E. G. Cooley, of Chicago, on the "Gospel of Work," and ended on Thursday evening with an address by Dr. John Dewey, of The University of Chicago, on "The Situation as Regards the Course of Study." Among the other names on the program were Dean Briggs of Harvard University, Superintendents Soldan, of St. Louis, Greenwood, of Kansas City, and Boone, of Cincinnati.

The Wednesday morning session was entirely given up to manual training and domestic science. The first speaker was Mr. J. H. Trybom, who gave a report of the work in manual training being done in the public schools of Detroit, Mich. His address will be printed in full in a later issue of this MAGAZINE. The second paper was presented by Principal Henry S. Tibbitts, of Chicago, and is given in full on pages 138 to 142.

MANUAL TRAINING AT MENOMONIE, WISCONSIN.

The third paper was a report of the manual training in the public schools of Menomonie, Wis., by Superintendent Judson E. Hoyt. The paper began with a historical sketch of the public schools of Menomonie, a city of 5650 inhabitants, having a school enrollment of 1650, of which 148 are in the high school. This introduction was followed by an exposition of the school system of the city which has been completely renovated during the past ten years since the introduction of manual training.

"The school system now consists of a kindergarten system of three kindergartens, which, with the primary schools of the city, is under the immediate care of a supervisor, who also is head of the kindergarten and primary training school; of twenty-five lower-grades schools; of a high school, which offers four four-year courses, and of the manual-training school, which, having, as now conducted, no separate student body, belongs to the school system as a whole, and is an aggregation in one building

of the rooms, appliances, and instructional force for the teaching of the purely manual, industrial, and art phases of the manual-training courses, together with the special knowledge-matter on which these are based."

Continuing the speaker said: "To the Hon. James H. Stout, a gentleman of large means, philanthropic disposition, and deep interest in all forms of educational effort, the city of Menomonie is indebted for its initial prompting, as well as the provision of the material means for the introduction of both manual training and the kindergarten work into the public schools. We have here an instance of a people being led out into a way which they knew not, which they did not choose originally for themselves, by the deeper insight, strong purpose, and wise leadership of a single public-spirited individual, supported by a liberal use of private funds."

After describing the equipment of the Stout Manual Training School, Superintendent Hoyt gave somewhat in detail the plan of the manual-training work pursued in the several grades, including the high school. One noticeable feature of this plan was the small amount of time per week devoted to manual training. In the high school this was three fifty-five-minute periods, with two periods of the same length for drawing. The work, however, extended over the entire four years. This plan should have been discussed by some present who are following a different plan.

The fourth paper was read by Mr. R. Charles Bates, of Tome Institute, Port Deposit, Md. His subject was

POSSIBILITIES OF MANUAL TRAINING FOR MORAL ENDS.

He had been asked by the president to give some results of his observations on the work of the New York State Reformatory at Elmira,[1] made during the five years he was director of manual training in that institution. We quote his two concluding paragraphs: "Manual training is not only of value as an educational factor leading to self-activity and mental development, but it becomes in the hands of the scientist, one conversant with pedagogy, physiology, psychology, and applied mechanics, a potent factor for moral ends. It opens up avenues for activities which are in direct consonance with the laws governing moral expression. All morality is but a harmonious adjustment of one's higher self, or nature, with known elements in human character, which elements are the vital forces in society that lift it above license, above conspiracy, above abuse. It is that force in human affairs which removes the disposition to riotousness, to self-abasement, and puts one in an atmosphere of conscious relation to divine law. It is clear to my mind that the presence of manual training in our public-school system will have a far-reaching influence upon human activities because it gives that delightful balance in mental growth which indicates the wisely educated person. For defectives in public institutions it is possible through manual training to awaken dormant consciousness of creative force, and further, it brings into use the neglected motor areas of the brain through the enforced functioning of their corresponding muscular agents.

"I cannot close this paper without reference to that pertinent remark of Ruskin made long before the science of teaching was as well understood as at present, it is as follows: 'A boy cannot learn to make a straight shaving or drive a fine curve

[1] For articles by Mr. Bates on the manual-training work at Elmira, see *Popular Science Monthly*, March, 1900; *Journal of Sociology*, April, 1897; also the *Elmira Reformatory Yearbooks* for 1897–8–9 and 1900.

without learning a multitude of other matters which the life of man could not teach him.'"

DISCUSSION.

After Mr. Bates' paper the remainder of the session was spent in a general discussion. What follows is from a stenographic report of that discussion.

Colonel Francis W. Parker, President of Chicago Institute: In 1883 we started manual training in the basement of Cook County Normal with rude benches, poor tools and a fair teacher. So far as I know it was the first manual-training school in connection with a normal school. The sloyd had not come to these shores, the kindergarten had been started fourteen years, psychology had not appeared, nor child-study. I had a faith that the activities of the child were not duly recognized; that he was intensely active and that he had not enough to work off and develop his energy in the right direction. What to do I did not know, but to do something I did know.

They told us — we got it dogmatically — that the little children should have no chance; manual training had begun in the high school. Things always begin wrong end to, and one who reads the history of education can bring that out. We took the little six-year-olders in and gave them woodwork — planes and saws — and it was perfectly plain and we saw at once that the children were getting their birthright. They were dying to *do* something and we found it out. Blindness to all this consists in excursions and results outside the child. When you look at the child you find what we mean. We have been trying to get at that and we have just begun. I will not go into the details of that, only I never saw a child who did not love manual training, and the boys and girls love it alike. I would have the boys learn to cook and to sew if that is educative.

What work shall they do? Our friend Salomon says logical sequence is an error and yet the sloyd is founded upon it. The sloyd has done an immense amount of good; I do not know what we should have done without it; but the fundamental element, logical sequence, is a fundamental error in all education. It leaves out the child entirely and says he must go through this work perfunctorily.

In the first place we have learned that the child is full of activity. He wants to put his thought into the concrete — every child, rich and poor. It has been a delight to watch the children who have been unfortunately rich and neglected, who come into the shops. When they find they are to do something themselves, delight seizes their souls; they are full of activity.

Dr. John Dewey, the great philosopher of the new education, when I asked him years ago, "What would you have a school?" replied: "Industrial." I agree with him heartily.

Of the many things done in Menomonie, one of the most beautiful is the horticultural work, the adornment of the homes with flowers and trees. A skillful, trained landscape gardener comes. He lectures to the people who come together to learn how to beautify their homes, and this artist will go there and advise anyone, the highest and the lowest, how to beautify their homes. When education penetrates the home and home penetrates the school, move on.

Superintendent Joseph Carter, Champaign, Ill. I think the danger just now, after this report from Wisconsin, will be that superintendents of schools will think that unless they have a rich man to furnish the money, nothing can be done. I have been in two very poor (financially) communities, but I have had no trouble in

starting manual-training work. We have sewing for the boys as well as shopwork, and we do not have the girls saw. The colonel will say we have gone wrong, but there is an educative value in the boys learning to sew.

Dr. C. M. Woodward, Director of Manual Training School, Washington University, and President of Board of Education, St. Louis, Mo.: I would like to take three or four minutes, first of all to express my deep feeling of satisfaction that the superintendents' section of the National Educational Association is in the temper it is in today. I have talked before this section when the temper was altogether different. I talked on manual training at the meeting twelve years ago in Washington, when it seemed as if nearly every man there stiffened his back and said: It is all a fad and will disappear in five years. It did not disappear, and I am glad that today we all have our faces looking one way. It is found to be true that there is a good deal more in manual training than learning to be a carpenter or a blacksmith.

Some reminiscences have been expressed here today. One gentleman, when I came into this hall, reminded me that he had heard me lecture in 1878 before the State Teachers' Association of Missouri. My first discourse on manual training before the National Educational Association was in 1882 at Saratoga, when I showed what the St. Louis Manual Training School was doing. But manual training has broadened since that time. It has gone out into the lower grades, and now we are giving the younger children the essential elementary steps. It is going on in St. Louis in the public schools just as I hope it is in the public schools of all communities.

Those were excellent papers this morning. I should like to ask in regard to salaries, special teachers, etc. One of the bugbears of manual training all the way through, that of expense, has been done away with in the case of domestic science. In St. Louis the teacher has fifteen classes a week through the entire school year. She is allowed $100 for material. The chemical laboratory methods have gone into the cooking room. The idea that you need a panful of material to show a principle which may be made evident by a spoonful has been abandoned. Domestic science has taken on a systematic, educational method where principles are to be established. I wish to assure you also of the tremendous interest that the fathers and mothers take in that work. In St. Louis we have a special domestic science room for the colored children. They are obliged to pay ten cents for car fare every time they come, yet their attendance there is more regular and faithful than on anything else. I have this testimony from them and from their mothers who come in and see what the children are doing. It is having an effect on the colored race that nothing else has.

It is very easy to start manual training in a community if it is necessary. You do not need a millionaire, but you can always find someone to set the ball rolling. I found six men and one woman to pay for the expense of fitting up a domestic science room and the running expenses for one year. That cost $1,500. That was sufficient to equip the room, buy supplies, and pay for a teacher. Then the board of education took it up; there was nothing else for them to do. They took it up and established three more, and the next year they established three more. So it goes. It is so in every community if you only have faith in yourselves, faith in the cause, faith in the people.

Superintendent George Griffith, Utica, N. Y.: Perhaps I have a few figures here interesting to people of cities of medium size. We are now on the fifth year of our manual training. In the fourth, fifth, sixth, seventh, eighth, and ninth grades it is as

obligatory as arithmetic, and as a matter of course every pupil takes it. The cost of that has been borne entirely by the city. I have here the cost for the last year for the 2,800 pupils who took it:

Teaching (five teachers)	$4,200
Supplies	540
Additional equipment	99

The total cost for supplies for the year averaged $0.19 per pupil. The total cost for supplies, additional equipment, and teachers' salaries for the year was on the average $1.73.

In any city of ordinary wealth and progress it seems to me that it is entirely practicable to have manual training without the aid of any public-spirited, wealthy man.

NEW ENGLAND ASSOCIATION OF METALWORKING TEACHERS.

THE fifth semi-annual meeting of the New England Association of Teachers of Metalworking was held at Springfield, Mass., November 31 and December 1, 1900. The attendance was larger than at any previous meeting, and an air of earnestness and appreciation was constantly in evidence. The first day was spent in the shops of the United States Armory, and, although weary, the members visited the evening trade classes at the Springfield Mechanic Arts High School, where the teaching of trades at public expense was closely observed, the earnestness and business-like interest receiving favorable comment.

On the second day, after inspecting the shop equipment, the members of the association were warmly welcomed by Mr. Charles F. Warner, the principal of the Mechanic Arts High School, in an address which dwelt with considerable detail upon the growth and probable future of the trade-class work of the school. Mr. E. R. Markham, superintendent of the Waltham Watch Tool Co., spoke in an entertaining and prophetic manner on "Handwork in Modern Shop Practice." The advocates of the chipping and filing courses were greatly encouraged by the decided stand taken by the speaker in favor of more thorough instruction in the use of hand tools. Several plans were presented as to the best methods by which to make this laborious and frequently monotonous work interesting and instructive to the pupils. A series of interesting models was deemed to be a necessity, and several members suggested novel methods of presentation.

A detailed description of the course in forging at the Rindge Manual Training School, Cambridge, Mass., was given by Mr. James G. Telfer, instructor in forging. The freehand element, as shown in scrolls and bent work, was prominent in this course, and the discussion was particularly upon the admissibility of the use of forms or templets in the production of such work. Several members held that such work should be produced without artificial aid, while others maintained that, especially where curves were to be duplicated, a templet was a necessity.

After the annual dinner at the Hotel Worthy, Mr. C. A. Davis, of the Department of Mechanics, at the Providence, R. I., Manual Training School, presented an interesting paper on "Notebooks and Shop Accessories." The speaker suggested methods for duplicating shop notes, and also presented some specimens from different schools, showing that some uniform method could be adopted which would result in

greater value to the pupil, and at the same time be more available for exchange and comparison.

At the business meeting the following officers were elected for the year 1901: President, Frederick W. Turner, Cambridge, Mass.; Vice President, C. Abbott Davis, Providence, R. I.; Secretary-Treasurer, Philip Goodrich, Lynn, Mass. Four active and four associate members were elected, and the association adjourned, with the feeling that the last meeting of the century had been one of great benefit.— F. W. TURNER.

QUERIES.

2. How much latitude in the choice of models should be left to the teacher? and how much can be safely intrusted to the pupil's own initiative?

5. (*a*) Ought I to recommend the use of a desk cover or some similar schoolroom device in our grammar grades? (*b*) If so, what form of desk cover is most satisfactory? (*c*) What tools should accompany it, and what will such an outfit cost?

REPLIES.

2. To see clearly an educational duty of this kind we must at first consider all conditions to be ideal — board of trustees, superintendent, room, plant, supplies, number and size of classes, character of children, and manual-training teacher. In this case the teacher will be supreme in his work. His enthusiasm will make his duties part of his very religion, and two elements will fix the character of the models: his own experience and the initiative of the children. How far the latter may safely go, no one but he may judge, and he must decide this for each child separately. Invention, design, and originality of expression among the children will add an interest and richness to the work that will surprise both teacher and children. The superintendent will inspire, suggest, and encourage, but will refrain from interfering, as though the work were sacred; and the trustees will support and approve. A teacher should be chosen because of his ability, spirit, cultivation, and general wealth of character. He should be paid enough to attract and hold such a man, and then he should be left to follow his own soul and should not be required to compromise with anybody. He should be the authority in his own work, and when he does not satisfy he should be asked to make room for someone who could satisfy without compromise. A good man with a sensitive nature cannot put his soul into his work if the superintendent or the head of a department requires him to work out some scheme foreign to the teacher's own training and nature. In this connection it should be remembered that a manual-training teacher should be occupied primarily with his profession, and should never be required to perform the duties of a carpenter. To study the children, keep the room in order, review designs, make drawings and models, keep records, and devise means of keeping the work alive and securing the highest individual development are matters that will require all the time and energy of a conscientious teacher. Whetting tools, putting up shelves, building furniture, fitting vices, repairing breaks and other carpenter work should be done by a carpenter. The teacher can do such things, but if he does his own work will suffer, because his whole time is needed by his classes. Cheap equipment, cheap teachers, cheap methods that require the teacher to do carpenter work and janitor work, are only to be condemned as an injury to education, except where a rare enthusiasm and devotion make them a temporary benefit.

In an ordinary school, of course, conditions are far from ideal. Pay is small, supplies scant, equipment inherited from someone who knew little about selecting, classes large, room cramped, and work appalling. This can all be overcome heroically by a teacher who is left alone; and I have known of cases in which splendid work has been done in spite of such disadvantages, though the teacher often breaks down under the strain. But do not add to this an interference that says, "For the sake of uniformity in our schools, or for the sake of my pet fad, you must use these models and not those." Is there no art of teaching? Is no one to be free to do his best? "How much latitude in the choice of models should be left to the teacher?" I answer, if he is a teacher, 180 degrees; if he is not a teacher, get rid of him at once. How much latitude shall we allow the doctor in the choice of medicines, or the gymnast in prescribing exercises, or the blacksmith in choosing horseshoes, or the astronomer in selecting lenses, or Kipling, forsooth, and Michael Angelo and Ericsson and F. Hopkinson Smith, in the pursuit of their professions? Is the manual-training teacher the only one who does not know his own business? Because the same spellers and readers are used throughout the city, must the same models be adopted by all teachers and a certain wise "latitude" allowed? I know a wise supervisor who is also a teacher and naturally likes his own course best, but he requires nobody to adopt it. His teachers were allowed to do as they thought best. They selected their course, and their work has been remarkable for richness, beauty, and originality of conception.

On the other hand, I have too often seen fine men much depressed by being obliged to carry out foreign ideas of superior officers more or less ignorant of the actual conditions that obtain in the manual-training room. This has always seemed to me a misfortune and sometimes even an impertinence, and it never fails to take the teacher's heart out of his work. He does not tell his superior of his difficulty, but he lets others know sometimes. Of course, good may come of it. Good often comes to us from irksome work that we are forced to do. But this good would come to the teacher only, in most cases. The greatest good would come to his work and to the children if he were free to put his whole strength into it and to make it an expression of his best self: purely, honestly, generously, and wholly his own.

"A man is relieved and gay when he has put his heart into his work and done his best; but what he has said or done otherwise shall give him no peace . . . . "
—CLARENCE S. MOORE.

BREVITIES.

THE Western Drawing Teachers' Association will hold its meeting this year at Rock Island, Ill., on April 23 to 25. The program promises to be one of unusual interest to teachers of the manual arts. Among the leading speakers are to be Mr. Arthur W. Dow, of Pratt Institute, who will lecture on "The Teaching of Art," illustrating with blackboard sketch; and Professor Charles Zueblin, of The University of Chicago, who will tell of "William Morris and His Work." On Thursday morning the general subject of "Construction in the Grades" will receive attention. The president of the association, Miss Clara A. Wilson, of Davenport, says in her preliminary announcement, "We shall seek further light on the relation of drawing and art to manual training."

THE next meeting of the Eastern Manual Training Association will be held at the Central High School in Buffalo, N. Y., June 27, 28, and 29. The executive committee are anticipating the largest and most successful meeting in the history of the association. They hope to arrange the strongest program that has yet been presented and preparations are being made for an exceptional exhibit of educational manual training work.

MR. WILLIAM T. BAWDEN has been commissioned by the executive committee of the Eastern Manual Training Association to prepare an exhibit of manual training tools, equipment and appliances for the Buffalo meeting. Mr. Bawden wishes this exhibit to illustrate the various ways of using blue prints and drawings in the shop, specimens of woods and leaves, devices for showing expansion and contraction of wood, and porosity of wood, etc. Such an exhibit ought to prove interesting and instructive. Teachers who will coöperate in this should address Mr. Bawden at 15 Sixteenth St., Buffalo, N. Y.

THE officers of the manual-training department of the National Educational Association are making large plans for the Detroit meeting, July 8 to 12. In addition to the usual two sessions a social gathering is being arranged for which is intended to give the teachers of manual training a pleasant hour together and enable them to get better acquainted with each other. This social feature is in charge of the local committee on manual training, of which Mr. J. H. Trybom is chairman. The department is fortunate in having been assigned with four other departments, to the high-school building. Here also will be the exhibit, and it is hoped that manual-training work will be a prominent feature of it. A new feature in this connection will be special facilities for studying the exhibits. Times will be announced when representatives of the schools sending the leading manual-training exhibits will be at their exhibits to explain them fully and answer questions concerning them. Subjects and speakers for the sessions have not been fully determined, but in general it may be said that one session will be devoted largely to the report of the committee appointed last year to work on the relation of the manual-training high school to trade instruction, and the other to manual-training work for the lower grammar and primary grades. Girls' work as well as boys' will have a place on the program.

THE summer session at Columbia University, New York City, will begin July 8 and close August 16. Courses will be given in thirteen departments. In the department of manual training two are announced: manual training for lower grades — cordwork, raffia, and reed basketry, paper and cardboard work, bent iron work, and elementary woodworking — by Miss Weiser; and woodworking for elementary schools by Mr. Eklöf.

THERE will be a summer school for teachers at the Mechanics' Institute, Rochester, N. Y. The courses will consist of work in clay, cardboard, wood, and Venetian iron; also mechanical and freehand drawing, if desired. The school will open July 8, and close August 3.

THE Teachers' Training College of the German Association for Manual Instruction at Leipzig announces summer courses in several departments. Besides the usual manual-training courses in wood, clay, cardboard, metal, and glass, a two-weeks' course in gardening is offered. Particulars can be obtained in this country from Mr. F. R. Inman, of the Providence Manual Training High School, Providence, R. I.

THE summer courses at Nääs, Sweden, for 1901 are the following: Course No. 92 from June 12 to July 24; course No. 93 from July 31 to September 10; A course for the teaching of games will also be held from June 12 to July 24. These courses include lectures and discussions on the teaching of sloyd, its educational and historical significance, and on the arrangement of such instruction in schools, in addition to practical work in the sloyd room. Only teachers who are employed in schools are, as a rule, allowed to attend the courses. Instruction, wlth materials and use of tools, gratis. Nääs, Flodastatim, Sweden, Otto Salomon, Director.

THE proceedings of the last meeting of the Eastern Manual Training Association held in Cleveland, O., June, 1900, have been printed and are ready for distribution. They can be secured by sending five cents postage to W. E. Roberts, 190 Euclid Ave., Cleveland, O. Back numbers of proceedings may be secured by sending postage to Mr. Roberts. There are still a few copies of the revised bibliography of manual training which may be secured by those not members of the association at twenty-five cents per copy. All of these publications will be sent free of charge to those who become members of the association.

MRS. IDA H. CLARK, supervisor of girls' work in manual training in Saginaw, Mich., is reaching out beyond her own city, and being helpful to a wider circle of teachers. Her experience in Minneapolis and Denver and her later study in the east enable her to be of assistance to others in planning courses in domestic science and art.

PRESIDENT SCHWAB, of the Carnegie steel works, who is now providing for instruction in manual training in the Homestead (Pa.) schools, promises a $200,000 manual-training school to the people of Homestead, if they will find a way to maintain it. It is needless to say that Homestead is making the endeavor.

IF dates can be arranged, the industrial section of the American Deaf and Dumb Teachers' Association desires to hold a joint meeting with the Eastern Manual Training Association at Buffalo in June.

MR. DANIEL UPTON, director of manual training in the Buffalo public schools, is the secretary of an organization called the Teachers' Pan-Tourist Company which has been organized to furnish teachers visiting Buffalo next summer with good accommodations at reasonable rates. In fact the company is going to make it possible for one to live in Buffalo during the Exposition at a very low rate, as prices go at such expositions. The organization has the indorsement of leading educators in Buffalo.

ALABAMA.

THE Tuskegee Normal and Industrial Institute at Tuskegee has been given the funds necessary for the establishment of a model training school. This building is to include in addition to the regular class rooms, facilities for a kindergarten and manual training for boys and girls. There is to be a small garden where elementary agriculture will be taught.

MR. J. W. CARTER, the head of the carpentry division, has resigned his position at Tuskegee to accept the position as superintendent of the industrial department in the Union Theological Seminary at Richmond, Va.

THE new building at Tuskegee, where the trades for the young women will be taught, is nearing completion. — ARTHUR U. CRAIG.

MINNEAPOLIS.

For several years there has been a gradual and steady improvement in the industrial work of the primary grades in the Minneapolis schools. Out of the old busy work, that merely "busied," has been evolved work of such a character as to be accepted and entered on its own merits in the Arts and Crafts Exhibit, recently held by a society of artists in Minneapolis. This evolution has been the result of high ideals, persistent effort and hearty coöperation of the primary teachers and the supervisors of the primary and art departments. The effort has been to make the work truly educational from the points of view of both motor and artistic training, and to keep it in close touch with the thought-basis of the other work. It is the hope of the superintendent and his assistants that the near future may see established in our city a systematic course in industrial work throughout the eight grades, that shall immediately connect with a course in manual training and domestic science in the high schools. At present the first three grades are making furniture for doll houses, mats, baskets and articles of home use. The principal materials used in making these articles are cardboard, raffia and rattan. On simple looms, such as are easily made at home, the children are weaving rugs with rags, worsted and carpet yarns; they are knitting on knitting needles, and crocheting with large bone needles, but the principal feature of the work is weaving in its various forms, and rug, mat, and basket-making.

The following editorial taken from the Minneapolis *Journal*, one of its leading dailies, is of interest:

"The Minneapolis public-school department of the Arts and Crafts Exhibit abounds in refreshing surprises for those who do not keep closely in touch with the many-sided public-school work. The rugs and baskets there shown are graceful in form and harmonious in color. Some of these little articles, beautiful in their simplicity and admirable in their excellent workmanship, were made by children of six and seven years, and all the little art-workers are in the lower grades. The children who do such work cannot fail to receive valuable and lasting impressions of the first principals of art. And such impressions cannot be retained without ennobling and elevating consequences. It is encouraging to think that the children of the public schools, those of adverse surroundings as well as their more fortunate brothers and sisters, are being taught art and good workmanship at the same time that their hands are instructed in useful labor. It means a higher grade of citizenship, a richer and fuller and more self-satisfactory life for their rising generation."

J. E. Painter.

BOSTON.

Mr. C. B. McDonald, recently of Lowell, Mass., is on his way to start a manual-training school in Oorfa, Turkey.

Miss Mary E. Pierce, one of the manual-training teachers in the grammar-school work, has been selected to make a beginning in the training of manual-training teachers at the Boston Normal School. The course is an elective, and has the endorsement of the school committee.

Mr. W. A. England, formerly of Haverhill, Mass., has been appointed to a position in the grammar-school work here.

Miss A. V. Phelps, who had charge of all the manual-training in the Milton high and grammar schools, died in January, of pneumonia.

Mr. Walker, of the Sloyd Training School, '01, has accepted a position at the Thompson's Island Reform School.

Miss Anna A. Wahlberg, S. T. S., '01, left February 14 for Santiago, Cuba, with a full equipment of tools and benches. She is working under the auspices of the Cuban Orphan Society, supported by New York people. The government gives the use of a building. A kindergarten goes under like circumstances.

Through the kindness of Mrs. Quincy A. Shaw, three native Cubans are studying at the Sloyd Training School. All their expenses while in this country are defrayed by Mrs. Shaw on the one condition that they teach two years in Cuba, on their return home.

Papers read recently before the Boston Manual Training Club are the following: In January, "Screws and Nails," by Mr. Alexander Miller, of East Boston; in February, "Veneers and Veneering," by Mr. Edward R. King, of the Howland School, New Bedford; and in March, "Methods of Construction," by Mr. George F. Hatch, of West Roxbury.

The Boston school committee has voted $5,000 for summer-school work this year. This contemplates the operation of several woodworking rooms.

During the winter a course of evening lectures on forestry have been given in Public Latin School Hall under the auspices of the Boston Manual Training Club. They have been as follows: (1) "The Dangers to our Trees and Forests," by Mr. J. G. Jack; (2) "Timber, its Growth and Uses," by Mr. J. Woodward Manning; (3) "The Winter Aspect of Trees," by Miss Frances C. Prince; (4) "The Forest and its Uses," by Mr. John M. Woods; (5) "School Gardens and Shade Trees," by Mr. J. Woodward Manning.

Through the munificence of Miss Mabel Simpkin and her brother, Yarmouthport and South and West Yarmouth are to enjoy the benefits of manual training for at least three years. Three rooms have been fitted up with tools and benches. All boys from the four upper grades of the grammar schools are receiving instruction. In the high school an opportunity to take up the work was offered to all pupils, and it is of interest to learn that all of the girls elected to take the manual training. The work is under the supervision of Miss Isabel Shore.—John C. Brodhead.

CALIFORNIA.

The Pacific Manual Training Teachers' Association, at its meeting in December, elected the following officers: President, Arthur H. Chamberlain, Throop Polytechnic Institute; vice president, Miss Caroline E. Harris, Los Angeles; secretary, Miss Sallie Peabody, Throop Polytechnic Institute; treasurer, Miss Ella V. Dodds, Los Angeles.

The association held a meeting on February 3, at Throop Polytechnic Institute, in two sessions—10:30 A. M. and 1:30 P. M. Luncheon was served by the normal department of domestic science, some sixty members and teachers being present.

The meeting took the form of a round-table, and vital questions relative to the work were discussed. Dr. J. H. Hoove, of the University of Southern California, proposed the question, "In what form does the mind conserve power developed by manual training?" The speaker took the ground that power acquired in one direction is utilized in that direction only. Professors Charles A. Kunou, of Los Angeles, and T. H. Kirk, of Monrovia, crossed swords with the first speaker.

Looking toward the possible introduction of manual work into the upper four grades of the county schools, the relative merits of various courses and processes were

discussed, paper and cardboard whittling and benchwork each coming in for its share of approval.

The association will purchase books and periodicals to form the nucleus for a circulating manual-training library. The next meeting will likely be held on the 1st of June next.

THE program for the Manual Training Summer School of Throop Polytechnic Institute is being prepared. Work along a variety of lines is to be offered.

THE second annual session of the Summer School of Manual Training at Throop Polytechnic Institute will convene July 8, and continue four weeks. This year additional courses and instructors will be added. Dr. Edwin D. Starbuck, assistant professor of education at Stanford University will offer a course in educational psychology. Arthur H. Chamberlain, professor of pedagogy in the institute and director of the summer session will give work in the philosophy of manual training, and in study of methods and courses. Benchwork, sloyd, paper and cardboard construction, apparatus making, freehand and mechanical drawing, wood-carving, clay modeling, pyrography, and work in elementary processes for primary grades, will be offered.

THE Lugonia District of Redlands has just completed its new manual-training hall. One room is fitted with benches and all appliances for toolwork, while the other room will be utilized for drawing and the elementary manual-training processes. The dedication took place jointly with the commemoration of Washington's birthday, on the 21st of February.

THE schools of Los Angeles city, Pasadena, and other southern California localities are preparing to send exhibits of manual work to the Pan-American Exposition at Buffalo.

AT the manual-training and drawing exhibit of the State Teachers' Association, held in San Francisco, December 26–29, Throop Polytechnic Institute showed work from the normal departments of domestic art and sloyd. A suggestive course in paper and cardboard was also shown.—ARTHUR H. CHAMBERLAIN.

NEW YORK CITY.

AN exhibition of pupils' work was held at the Hebrew Technical Institute of this city on February 12 in connection with the annual reception of the Women's Committee. Excellent work was shown in all departments — a natural result of the labors of an efficient staff of instructors among boys who realize that their daily tasks lead directly to the occupation they are to follow when school days are over. Reports received from graduates of the institute show that some 70 per cent. are engaged in mechanical pursuits.

The Institute is soon to have its capacity enlarged by the erection of a new building, to be called the Lucas A. Steinam Metal Working School, the gift of Mr. Abraham Steinam in memory of his son. The new school is to occupy the site of the building lately used by the Baron de Hirsch School, adjoining the Institute. It will be six stories in height, covering a ground space of about 30 by 50 feet. The top floor is to be used as a forge-shop and molding-room; the fifth floor will be devoted to mechanical drawing, the fourth to wood-joinery, and the third to wood-turning and pattern-making.

Mr. Steinam, who has already endowed two rooms in the present building, has given $100,000 for the erection and endowment of the new school.

MEETINGS of the New York Manual Training Teachers' Association have been held monthly during the winter at Public School No. 30. At the January meeting Mr. Edwin W. Foster gave a lecture on "Leaf Forms of Our Common Broad Leaved Trees," illustrated by mounted specimens. At the conclusion of the discourse the appreciation of the audience was shown by a vote of thanks tendered to the lecturer.

At the February meeting it was decided, on talking over plans for the future, to take up the discussion of methods of work and problems of management. Since all active members of the association have the same course to teach, and are working generally under the same conditions, such an interchange of views cannot fail to be of value.

IN the public schools of Manhattan and the Bronx the spring term begins with practically the same course laid out for that of the workshops as that of the term just ended. In Grade 5B, where knifework is done, the modifications are chiefly in the size of stock used, in several models ¼ inch thickness being substituted for ⅛ inch. A few alterations in the design arrangement of models in the succeeding grades tend to adapt the work better to the capabilities of the pupils.

An important feature of the course is the supplementary model made at the end of the term after the completion of the regular exercises. A number of models are placed before the class as suggestions, and each pupil is allowed to select what he would like to make and encouraged to modify the design in accordance with his own tastes and requirements. The work is then done under the direction of the instructor, the results being in many cases most gratifying.

Monthly meetings of the corps of shopwork instructors, presided over by the supervisor, Dr. James P. Haney, will be held during the term at Public School No. 3.

THE domestic art work carried on in the Horace Mann School, Teachers College, under the direction of Mrs. Mary S. Woolman, affords a most interesting study in that branch of manual training. The course embraces a variety of operations, including cardwork, raffia work, basketry, weaving, sewing, etc. The development of the textile industries among primitive races is used as a basis for the sequence of thought and work presented to the children. From the study of the sheep, for instance, they pass on to the scouring of the wool, carding, spinning, dyeing, and weaving, most of the operations being actually performed by the children themselves. The most primitive implements are used at first.

Special attention is given to the development of orginality. The children are led to suggest methods of doing things, to make their own designs, and to discover for themselves many of the arts and processes in common use. The inventive genius thus aroused is often remarkable even among children of six and seven years of age.

To those who fancy that a course in domestic art consists of a series of set exercises in sewing, first with coarse stitches and later of more delicate character and in fine material — and there are still many such — a visit to this school would be highly educative as well as extremely interesting.

OHIO.

FOR all the Ohio items and a few others in this issue we are indebted to Mr. E. A. Bending, of Dayton.— ED.

COLUMBUS, O., is still with the "silent majority" of the larger cities in regard to manual training. Four well-equipped sloyd centres and many kitchens are still

idle, and have been since the work was abandoned in 1897. There is a strong sentiment in favor of the work, and its friends are in hopes of its being reëstablished in the near future.

AKRON.

At the close of the last school year the Akron board of education voted favorably on an extension of the manual-training department in both grammar grades and high school. As a result three new centres for grade work have been established and considerable new equipment and machinery have been added to the high-school department.

Sewing in the fifth, sixth, and seventh grades, and cooking in the eighth grade and high school comprises the work for the girls. All the work is required in the grades, but optional in the high school.

Knifework in the lower grades was discontinued on account of Mrs. Ida Hanshalter's resignation and subsequent acceptance of the supervision of sloyd in the Pueblo, Col., public schools.

The newly elected superintendent of instruction, H. V. Hotchkiss, is giving every encouragement to the work. With Mr. P. J. Fish in charge of the department, and a liberal board, Akron bids fair to be abreast with the larger cities of the state in manual-training lines.

CINCINNATI.

Cincinnati is still without manual training in her public schools, but Superintendent Boone reports that they are "negotiating and holding conferences in anticipation of making it a part of their regular course."

The "Technical School," a private manual-training high school, Mr. T. L. Feeney, principal, and the House of Refuge, are the only institutions in Cincinnati now having manual training as a part of their regular curricula. A project is on foot to attach the Technical School to the public schools.

CLEVELAND.

Under the able management and untiring efforts of Supervisor W. E. Roberts the extension of manual training in the elementary grades of Cleveland public schools has become the established policy of the public school authorities.

Two additional buildings are being opened as centres for seventh and eighth grade work. One of these buildings was designed and built expressly for manual training, and the other, a brick building, has been completely remodeled and adapted to the requirement of this work. This makes in all four centres for these grades, each centre accommodating about seven hundred pupils — boys and girls. All the primary grade pupils receive instruction in manual training, and the work is being extended to the fifth and sixth grades as rapidly as teachers can be prepared to take up the work. In addition to the above are the Central and West Side Manual Training High Schools and the University School, a magnificently equipped private manual-training high school. These, with the excellent system in the grades, places Cleveland far in the lead of any city in the state.

DAYTON.

Manual training in the public schools, in the Young Men's Christian Association, and the educational department of the National Cash Register Company's plant tends to show that the people of Dayton are cognizant of the educational spirit of the day.

A large, well-equipped central building for manual-training purposes only, accommodates all the grammar grades in the city, and, in addition, classes from the high school to a limited number; this, with sewing for the girls of the seventh and eighth grades comprises the work of the public schools. The Tadd system of drawing modeling, and carving has been introduced into the seventh grade with excellent results. Mr. W. C. Vail, a graduate of the University of Illinois, and later from Mr Tadd's school, is in charge of this department.

A well-attended night school is also maintained by the board of education at the manual training school, the instruction being confined to mechanical drawing and pattern-making.

The work of the Y. M. C. A. is confined mostly to evening classes, and is more technical in its nature, though there are afternoon classes in sloyd and drawing for the juniors, and the night pupils in all branches are advised to take some of the manual features. Besides the courses in the common branches and stenography, chemistry, languages, and higher mathematics, instruction is given in mechanical, architectural, and free-hand drawing and designing, modeling, woodworking, pattern-making, blacksmithing, and machine-shop practice. The equipment is excellent but quarters crowded, notwithstanding the fact that the present building is a fine one and comparatively new. A movement is now on foot towards the erection of a $300,000 institute, which will embody the present Y. M. C. A. and a large industrial school. It is being backed by the leading business men of the city.

THE National Cash Register Co., a concern employing between three and four thousand people, and one of the few large manufactories where the interests and the social and moral welfare of its employés are considered as its own, has an interesting educational department, open to the children of employés and of the portion of the city in which the factory is located. Kindergartens and sloyd are in charge of Miss Fouts, of Pratt Institute. The value placed on kindergarten training is voiced in a large poster, which reads: "After 1915 we will employ no one who has not had kindergarten training during their childhood."

The department of domestic science is in charge of Miss Igler, of Pratt Institute, and includes all the various branches. The cooking school is especially well attended by young women employed in the factory, the time being allowed them by the company. The domestic science department gives a daily lunch to some three or four hundred women — employés — on the same principle that many schools are serving lunches. They cost but four cents, the girls paying one cent and the company the other three cents. The difference in the work after having had a warm lunch makes it a paying investment for the company. A visit to the immense plant cannot but give the impression that here is one plant in the world that gives its employés something besides work and wages.

XENIA.

ONE of the most encouraging "signs of the times" is the establishment of manual training in the Ohio Soldiers' and Sailors' Orphans' Home, in *addition* to the many *trades* now taught. Courses in benchwork, pattern-making, wood-turning, carving, forging, and mechanical drawing are under way or about ready to begin, and others to follow. The work is to be established on an educational basis in connection with the excellent graded and high-school system of the home, but will also be preparatory and correlated with the trades, one of which each pupil is supposed to

thoroughly learn before leaving the place. An excellent course in domestic science is also open for the girls. This innovation — for such it seems to be — is due largely to the efforts of General Young, superintendent of the home, who is a former member of the board of trustees of the Toledo Manual Training School, and to Professor Edwards, superintendent of instruction of the home.

YOUNGSTOWN.

MANUAL training in Youngstown is confined to pupils of the Rayen High School. It is required in the first two years and optional in the third. Instruction is given in benchwork, wood-turning, pattern-making, iron machine work, and mechanical drawing.

An elaborate course correlated with and leading up to the study of physics has been conceived by Professor E. H. Birney, formerly principal of the Akron High School, who is in charge of both the manual training and physics departments. Each pupil works out, independent of any class or member, a special exercise for the physical laboratory. Excellent results are reported.

TOLEDO.

THE board of education has assumed full charge of the ward school manual-training work which the University Manual Training School had introduced into the public schools and maintained for the past two years. The entire outfit, consisting of several well-equipped centres, cooking schools, and knifework outfits, all costing in the neighborhood of $5,000, is now under the control of the board of education.

The University Manual Training School is no longer, but in its place has come the Toledo Polytechnic School, a manual-training high school, with its own corps of academic and technical teachers, separate and distinct from the Central High School, of which the old school was an adjunct.

The manner in which Superintendent Virgil G. Curtis, who was called to Toledo towards the end of last year, has taken the reins, gives evidence that he intends to bring manual training in Toledo to a point which it has never before reached.

"Four hundred and fifty students are enrolled in the Polytechnic; eight teachers added." "The Polytechnic Republic has been organized for self-government and training in citizenship." "A monthly publication, *The Tech*, gives opportunity for both literary and art departments to exercise their talent."

Bimonthly illustrated art lectures are given by Miss Mark, the head of the art department. "The students are enthusiastic," "teachers satisfied," and "the people interested," which all tends to show intensification of the work under the new management.

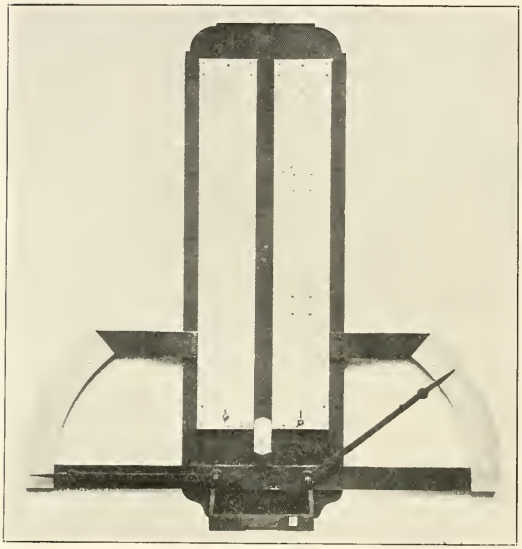
Three of the manual teachers in the ward schools received offers from Grand Rapids, and are now doing successful work in the grades of that city. They are Miss Ruth Chapin, sewing; Miss Nellie Wales, knifework; and Miss Florence Mead, knifework.

Professor Albert Armstrong, who for some years has been connected with the Toledo Manual Training School, in charge of the department of modeling and carving, has accepted a similar position in Detroit in the University Manual Training School.

Miss Georgia Ormond was appointed to fill the vacancy in the Toledo Polytechnic School caused by Professor Armstrong's resignation. Miss Ormond has studied in this country and abroad, and is well equipped for the work.

AN INSTRUMENT CAPABLE OF SHOWING THE EFFECT OF MOISTURE ON WOOD.

The engraving below illustrates an instrument (a hygroscope) which is used in the manual-training classes of the Mechanics Institute at Rochester, N. Y., for the purpose of showing the effect of moisture upon wood, or to make clear the meaning of the terms "expansion" and "contraction."



The apparatus depends for its operation upon the application of water, by means of a sponge, to both the front and back surfaces of panels A and B. When the apparatus is in position, the direction of the length of the fibers in panel A is horizontal and that of panel B is vertical. Therefore panel A shows the changes which take place "across the grain" and panel B the expansion and contraction "with the grain." The upper ends of the panel are fastened to the back board, and the lower ends are free to work up or down in a groove as they contract or expand, and thus act upon the indexes, which are connected with the panels by means of a wire.

Panels A and B are basswood, $\frac{1}{8}$ inch thick, $4\frac{1}{8}$ inches wide (between beds of grooves), and $24\frac{1}{2}$ inches long.

The frame is constructed of white pine. The stiles are $\frac{1}{2}$ inch thick, with a groove $\frac{3}{16}$ inch wide and $\frac{1}{4}$ inch deep. The stiles at the outer edges of the frame are 1 inch wide; the center stile is $1\frac{1}{4}$ inches wide.

The back board to which the stiles are fastened is $\frac{3}{8}$ inch thick, and but one piece. Openings are made in this back which in width equal the space between the stiles on the front. The length of these openings are made $\frac{3}{4}$ inch shorter than the length of panels, in order that there may be a place on the back board to secure the top ends of the panels. These open spaces in the back are necessary, for the reason that moisture is applied to the backs as well as the faces of the panels.

A cleat is fastened to the back of the panels at the top end, in order to fill up the space between the edge of the groove and the back board.

The three boards which form panel A are secured at the joints by means of thin, narrow strips of basswood, the grain being turned in the same direction as the grain of the panel.

For the purpose of increasing the thickness and adding to the strength of the panels at the lower end, a thin piece about 1¾ inches wide is fastened to the back of each panel.

The curved scales C and D are made of basswood ⅛ inch thick and 2 inches wide. The radius of the outside curve is 12⅝ inches, and the center from which it is described is the point upon which the index swings, the pivot.

The arms supporting the curved scales are ¼ inch thick and 1½ inches wide. The vertical distance between the outside edges of these arms is 10½ inches. From top edge of panel to top edge of lower arm it is 27 inches.

The indexes are $\frac{3}{16}$ inches thick and 13½ inches long. The pivot or point at which they are secured to the frame is ½ inch to the right and left of the centers of panels A and B respectively. From the pivot to the extreme point of the index it is 12 inches. It is ½ inch from the pivot to the point at which the wire (No. 19 brass), connecting the panel with the index, is attached. A loop is formed in the upper end of this wire, and it is fastened to the panel by means of a bolt which is about ⅛ inch in diameter and ¾ inch long. The bolt is provided with copper washers. Panel A is susceptible to the changes in the atmosphere; therefore it is necessary to cut a vertical slot in the panel for the bolt, about ¾ inch long, in order that the index may be easily adjusted to the zero mark, when the teacher is about to make use of the apparatus. F is a shallow pocket for the sponge.

Fastened to the lower edge of each panel is a wire which is formed so as to project over and partly across the face of card E; this enables the operator to register the real expansion after water has been applied to both surfaces of the panels.

W. W. MURRAY.

ILLINOIS.

THE recent absorption of the Chicago Institute by The University of Chicago is an event of first importance in the educational world. This brings to the University the $1,000,000 gift of Mrs. Emmons Blaine and the entire faculty of the Chicago Institute. It also makes possible what has long been desired — a combination of the three schools already under University control, the Chicago Manual Training School, the South Side Academy, and the University Elementary School. These three with the Chicago Institute and the present pedagogical department of the University will be brought together in one large building to be erected on the Midway at a cost of $325,000. The combined school will be known as "The University School of Education," and the reorganized pedagogical department of the University as the "Department of Education."

IN accordance with the instructions of the Illinois State Teachers' Association, G. R. Shawhan, county superintendent of Champaign county, is having the second year's work in agriculture prepared for the common schools of the state. This work is being arranged by Dean Davenport of the University of Illinois. The course was inaugurated last year, and when the matter of continuing it was brought before the annual meeting of the teachers, it was the unanimous sense of the body that the work should be continued.

PROFESSOR FRANK FORREST FREDERICK, of the University of Illinois, will be assisted this year in his summer school work at Macatawa Bay, Mich., by Mr. Charles Francis Browne, of Chicago. An attractive program is announced.

CONSTRUCTIVENESS is another great instinctive tendency with which the schoolroom has to contract an alliance. Up to the eighth or ninth year of childhood one may say that the child does hardly anything else than handle objects, explore things with his hands, doing and undoing, setting up and knocking down, putting together and pulling apart; for, from the psychological point of view, construction and destruction are two names for the same manual activity. Both signify the production of change, and the working of effects, in outward things. The result of all this is that intimate familiarity with the physical environment, that acquaintance with the properties of material things, which is really the foundation of human consciousness. —DR. WILLIAM JAMES.

THE IDEALS OF THE SCHOOLROOM.

THE ideal men and women placed before the minds of children in the school room are the poets, the orators, the painters, the soldiers, and the philosophers. The more highly cultivated the teacher, the more strongly such ideals are presented and impressed. The truth of the above is evident from the birthdays celebrated in school by carefully prepared exercises. Consult the published "programs" and you will find Longfellow, Lowell, Tennyson, Emerson, Bryant, Lincoln, Webster, etc. Consult the walls of their schoolrooms, and you will find portraits of painters and the older poets, and copies of the old masters. Consult their readers, you will find biographies of the same class of people.

Not only are such ideals constantly held up, but children are made to believe that the chief aim of education is to fit boys and girls to become great or at least accomplished along the lines of art or literature. If the teacher can point to a former pupil who has become a successful writer or artist, the event is kept in perpetual remembrance.

Now there is nothing wrong or unwise or foolish in all this except its *exclusiveness*. The exploits, the birthdays, the biographies, the triumphs, *which are omitted* show how one-sided, partial, and misleading the present practice is. Where are the birthday programs and biographies and portraits of such men as Edison, Bell, George and Robert Stephenson, Bessemer, Fulton, Watt, Howe, Faraday, McCormick, Huxley, Eads, and Ericsson? It is to these men and others like them that the wonderful triumphs of the last century are due. These men have made our modern civilization. And yet, all these men started in to wield, not the sword, nor the mightier pen, but the still mightier *tools* with which men have subdued the elements, and reduced the forces of nature to be our willing and obedient servants. These men have raised the standards of living, have filled our houses with comforts, and loaded our tables with plenty. They have covered our shelves with the best books, and hung our walls with the most exquisite works of the masters. These men have made it possible for us to know and enjoy those *other* men and women whom I first named, and whose birthdays and biographies and portraits we must not omit.

The high ideals we ought to cherish and to place before our children are legion, and education should equally lead up to them all. Let us revise our readers, our birthday programs, and get out an additional series of portraits and historical pictures. Let us open the doors into the wonderful workshops of civilization that children may see and understand and sympathize with the activities they are all *destined to share*.

C. M. WOODWARD.

EDITORIAL.

The manual training session of the Department of Superintendence was less noteworthy on account of what was said there than on account of what was not. Although the papers were good, the significant fact about the whole session was, as pointed out by Dr. Woodward, that everybody seemed to be headed in the same direction. Indeed, there was not enough criticism or opposition of any sort to stimulate a healthy discussion. Doubtless this was due in large measure to the fact that each paper was a report of what is actually being done or has been accomplished. In the face of such data the spirit of opposition did not manifest itself if, indeed, it were present. The attitude of the audience — an audience that filled nearly every seat in University Hall — was that of the open-minded listener — the student; superintendents had come to learn of ways and means of introducing manual training into their schools.

Such a frame of mind on the part of superintendents is the manual-training teacher's opportunity, and it places upon him greater responsibility. If the manual-training teacher is no longer obliged to use up his energy as an advocate — he has often been obliged to do that in the past — he can double his energy as an organizer. The time has come when the teacher who determines the character of the manual-training work, designs equipments, and spends public money is, with rare exceptions, wholly responsible for the success or failure of the manual-training work. Where he once found opposition or indifference he now finds encouragement and coöperation. There is no mistaking the present attitude of a large proportion of the superintendents: "We believe in manual training; demonstrate its practicability in our schools; reduce its cost; make it a vital factor in our educational system."

The attention of the advocates of manual training need not be devoted so much to the convictions and prejudices of individuals, or to the conservatism of community, but rather to the reduction of expense in equipping for manual training.— A. E. Winship, in *Journal of Education*.

REVIEWS.

A History of Education. By Thomas Davidson. 7½ × 5 in. Pp. 292. Price $1. Charles Scribner's Sons, New York.— This book is a determined effort to see education as a whole — namely, as the author says, conscious evolution. As such it is quite in accord, in purpose at least, with the general movement of the day; and in spite of faults the book is of great value because it makes a definite advance toward unification of the multifarious and hitherto almost unrelated data of the so-called history of education. The basis of unity is, of course, the idea of evolution; the great steps are these four phases of education: *savage, barbarian, civic, human.* It may be interesting to suggest the content of the groups: savage is, of course, prehistoric; barbarian includes Asia and Egypt, excepting Moslem education; civic, Judea, Greece, Rome; human, mediæval and modern Europe and the Moslem contribution.

Both thought and feeling are eminently healthy; there is neither chilling skepticism and pessimism, nor feverish and illogical optimism. The writer possesses, in unusual measure, the gift of enthusiasm without fanaticism; calmly and judicially he places men and things in their proper light, dealing to all an even-handed justice, often composed indeed, as must often be, of blame and praise. Perhaps the best example of this quality is his treatment of the work of Rosseau; compare especially his accurate and logical disposition of Rosseau's doctrine that the child is "by nature wholly good," with Compayre's comment, which, instead of correcting, falls into the opposite error.

The book is not for lazy readers; the style is vigorous and stimulating, with an occasional dash of Scottish dogmatism; but the author has evidently not intended it solely as milk for babes; strong meat is not wanting nor is it always predigested. It would be hard to find a more suggestive and discussion-provoking book on the subject; it is therefore just the thing for reading circles that meet and talk.

In the way of fault-finding, it may be said that the four phases of education, the conception of which form the ground plan of the book, are not defined with sufficient clearness; their relations to each other are not made sufficiently plain; this is particularly true of the last two, civic and human. But this is merely a part of the general condition; the book is striking out a new line of thought; many more efforts will be needed to complete the work here well attempted.

The mechanical make-up of the book is excellent, with one exception: the present writer, with no purpose of "reading proof," counted ten typographical errors, not all entirely innocuous: *e. g.*, Giordano *Brimo* for *Bruno* (p. 179); *Cemitic* for *Semitic* (p. 45).— E. O. Sisson.

A Course in Mechanical Drawing. By John S. Reid. Second edition, revised. John Wiley & Sons, New York, 1900. 6 × 9¼ in. Pp. 138.— Professor Reid is instructor in mechanical drawing and design, Sibley College, Cornell University, and this work was prepared to meet his requirements in the class room. He recommends it for use in teaching the elements of mechanical drawing in technical schools, colleges, high schools and evening drawing schools.

After an introduction in which he illustrates and describes a complete drawing outfit, the author devotes a chapter to each of the following subjects: instruments, geometrical drawing, "conventions" (*i. e.*, conventional representations), lettering and figuring, orthographic projection. In the last chapter, shades and shadows, isometrical drawing, and working drawings are considered.

Among the useful problems not generally seen in text-books is that shown in Fig. 48, the rectification of a semi-circumference; Fig. 68, approximate construction of the ellipse: and in Fig. 78, the method of describing the cycloid by the aid of a thin piece of transparent celluloid. (The undersigned has employed tracing cloth in the same manner.) The statement on page 56 that "draughtsmen have agreed upon conventional methods to represent many things" cannot be regarded as true if applied to the materials represented on page 58. The fact is that there is in this country no acknowledged standard for representing by the use of section lines the various materials entering into machine construction. The best practice is to name the material and section line in the ordinary way.

The chapter on lettering is timely, for, as the author well observes: "This subject has not been given the importance it deserves in connection with mechanical drawing." Most of the styles shown are, however, too precise. A few of the "catchy" alphabets would be welcome to students who, as a rule, regard the ability to letter free-hand more as a "gift" than an acquirement.

While Professor Reid's book is a good one, it is no better than the best of its kind now in use. The claim that the subjects are treated concisely is true; almost too true in the case of the chapter upon working drawings which from its importance might well have been more fully considered. The illustrative drawings could also be criticised as being rather too difficult of comprehension for the beginner.

J. H. Mason.

Woodworking for Beginners. By Charles G. Wheeler. G. P. Putnam's Sons, New York. $5 \times 7\frac{1}{2}$ in. Pp. 551; price, $3.50.—A practical book on woodworking for amateurs of all ages. Its aim, which is well carried out, is to give thorough and specific instruction how to make simple, useful articles. It does not carry the work far in any one line, but gives a very practical start in many, and, as the author states, does not teach things which will have to unlearned.

The book is divided into five parts. The first contains the introduction; a very elementary treatment of tools, woods, working-drawings, laying out of work, etc.; and also a very practical chapter on the amateur's work-shop and its equipment. I think it worthy of note, in this connection, that the author does not advocate a completely equipped shop to begin with, but rather a development of the equipment as necessity demands.

The second part treats of articles to be made in the work-shop; such as toys, houses for small animals, implements for sports and athletics, furniture and other miscellaneous operations.

Part three deals with simple house building. The author has treated this subject in a very pleasing manner by showing how his readers may, by working at simple structures first, become able to make very attractive but simple summer cottages.

The fourth part will find many admirers, especially among the boys, for it treats of the making of small boats, ice-boats, and house-boats.

In the fifth part the author has utilized one hundred and sixty-three pages with a very thorough and practical treatise on tools and operations. The matter is arranged

in alphabetical order, making it very convenient for reference. This part also contains, an appendix giving a more extensive treatment of woods, working drawings, etc., than is given in part one.

The book is certainly a very desirable one for those to whom it is addressed, and should also be in the library of every manual-training school as a book of reference.

C. S. VAN DEUSEN.

Mind and Hand. By Charles H. Ham. American Book Co., New York. 5 × 7¼ in. Price $1.25. On opening this book one is disappointed to find that it is not a new book, but the third edition of a book entitled *Manual Training*, published by Harper and Brothers in 1886. In the preface the author explains the change as having been made "in response to the common and just criticism of the original title as too narrow for the broad treatment of the subject which characterized the text." This is doubtless true if the words of the title are given their original meaning, but at the present time the term manual training means more than mere hand or muscular training; it has a broader meaning even than is implied in the present title of Mr. Ham's book. This change in title is sure to mislead and cause disappointment.

Otherwise the new book is a great improvement over the old, valuable footnotes and statistical matter having been added. The appendix contains fifteen pages of tables showing the extent and progress of manual training in the United States. Then follows notes on state laws in relation to manual training, and a brief, comprehensive review of manual training in foreign countries. Mr. Ham was one of the earliest and ablest exponents of manual training in this country, and his influence has been widely felt. It was largely on account of an after-dinner speech made by him before the Commercial Club that the pioneer school in Chicago, the Chicago Manual Training School, was established. The force of his style is no less apparent in his book. It is not a dry pedagogical treatise, but the work of a patriotic man of resources and literary ability who sees clearly that "one of the intrinsic needs in education is the training of the whole being — hand, brain, and soul — through educative work."

American Industrial Education, What Shall It Be? Preliminary report of a committee of the Society for the Promotion of Engineering Education, made at the New York meeting, held July, 1900. Reprinted from the annual volume of the society's proceedings. Henry S. Jacoby, secretary, Ithaca, New York. Pp. 74, paper covers, price 25 cents. This report is of especial value to anyone who is studying the trade-school problem and its relation to public schools. It begins by defining industrial education as "that education which specifically fits one for an industrial vocation or profession." It then states the question before the committee as follows: "What, in addition to the work that is now done in our primary and secondary schools, is it wise for us to attempt to do in schools of various sorts for those young people who are looking for employment in our manufacturing industries, or in commercial houses, or with great transportation companies, or in those new or more or less original adaptations of material means to social ends which are the peculiar problems of the engineering profession?"

In answering this question the report pays tribute to the manual-training high school, and emphasizes the importance of having manual training and art education a part of all public-school education from the kindergarten through the high school. It points to the valuable work being done by the state agricultural and mechanical colleges, and speaks especially of the Minnesota "agricultural school" as being a true secondary-industrial school. The higher engineering colleges are given little

attention in the report, because they are already so well understood. The most important part of the report is that devoted to monotechnic or trade schools. Probably the committee feel that they have done little more than stated the conditions of the trade-school problem. They will, no doubt, have much more to say on this phase of their subject, but their present statement is very suggestive. It may perhaps be summarized as follows: (1) The need of trade schools is becoming daily more apparent; (2) the European pattern of trade school is not suited to American needs; (3) in America all schooling should lead primarily to the elevation and development of the individual, and only secondarily to a greater material property; (4) every American boy should find his career entirely open at the top. Society here is not to be stratified horizontally, but rather vertically; (5) American trade schools should teach our boys many things besides the mere manual performance of a trade.

Not the least interesting part of the book is that devoted to the discussion which took place after the report had been presented by the committee. Especially do we refer to the discussion of the half-time self-supporting trade school by Mr. M. P. Higgins; of what constitutes a liberal education, by Professor R. S. Woodward and Professor Ayres; and of the question as to whom is due the credit of starting the first work in manual training in this country, by Professors Allen, White, Kent, Lanza, and others.

The committee presenting the report were Professor J. B. Johnson, of Wisconsin; Dr. C. M. Woodward, of St. Louis; Dr. R. H. Thurston, of Cornell; Professor H. T. Eddy, of Minnesota; Professor George F. Swain, of Boston; and Professor Edgar Marburg, of Philadelphia.

PERIODICALS.

The January number of the *Pratt Institute Monthly* contains an instructive article on the new art-metal course at Pratt, by Joseph Aranyi. This article describes the process of chasing, commonly known as repoussé work, and illustrates it with six photographs showing different stages in the process. This number also contains a very brief illustrated article on art leather work.

The Teachers College Record for November is devoted to handwork in the Horace Mann School, the model school connected with Teachers College, New York City. It contains so much matter valuable to everyone interested in art and construction work in the school that any review of it here will give an entirely inadequate impression of its contents. We advise our readers to send twenty cents at once to The Columbia University Press, New York City, for a copy of this manual-training number.

It contains (1) an article by Professor Charles R. Richards on "The Function of Handwork in the School;" (2) an outline of courses of study in the elementary school; (3) a similar outline of work in the high school; (4) an article on "The Fine Arts," by Professor Alfred V. Churchill; (5) one on "Domestic Art," by Mrs. Mary S. Woolman; (6) one on "Domestic Science," by Miss Helen Kinne, and, finally, (7) another by Professor Richards on "Some Considerations as to Manual Training Method." The whole is admirably illustrated with a large number of photographic reproductions of the work of the children in the Horace Mann School. It is easily the broadest and most suggestive single volume that has come to the assistance of teachers of manual training.

Professor Richards begins his opening article by defining education and stating

its aim "in terms of our current philosophy as the development of social efficiency in the individual." He then discusses what is implied in this aim and points out that "the task of education is to organize instinctive tendencies in human nature into habits of social value." "To put forth and express the self in outward form is the first law of being." This involves carrying thought and feeling into action. That this action should proceed in right directions and be effective in its character is of greatest importance; "that it should serve social ends is evidently a fundamental requirement." Self-expression through manual activities is most important in childhood; then it is that the instinct toward material forms of expression is strongest and most significant.

After discussing self-expression somewhat at length the writer says: "Perhaps the greatest practical problem in all this work is that of bringing the worker's own thought and feeling into the process in a real and, at the same time, an effective fashion. We must keep constantly in mind the truth that to leave out these elements is to leave out the pith of the activity — to leave out the life within the form. We may expect to find right motive in the work only when the worker realizes that the thing attempted is well worth the doing. This by no means implies that the task should be merely pleasant or agreeable, nor does it mean that an immediate end must necessarily be present in the operation. It does mean, however, that the undertaking must minister in some way to the life instinct of the worker. It means that the particular thing attempted must bring either added insight or sense of worthy achievement."

Again he says: "Only when the pupil is given opportunities for determining ends and working out means may we hope through manual expression, or indeed through any school work, to develop in the highest degree independence of thought and power of initiative."

"Both of these factors are essential in true self-expression, and both are essential to the vitality of manual activities in the school. The making of a project planned by the teacher may mean much, but the making of a project conceived and planned by the pupil means more. Only in this way is the natural cycle of mental activities — feeling, thinking, and doing — fully realized and made effective. Only in such terms can the full satisfaction and exhilaration of self-achievement be realized."

The final article in the magazine, as well as the outlines of courses presented, indicate the present status of the effort at Teachers College to realize this ideal. In certain phases of the work much has been done in that direction; in others much more remains for future development. The report is more stimulating on that account. It presents an ideal, suggests lines of effort leading in the right direction, and therefore is sure to have a salutary effect wherever it goes. It will help toward freedom many an earnest teacher who is now bound hand and foot by the shackles of a rigid-course ideal.

The following have been received, some of which will be given more extended notice in the July number:

Furniture Designing and Draughting. By Alvan Crocker Nye. William T. Comstock, New York. Price, $2.

A Course of Instruction in Wood Carving According to the Japanese Method. By Charles Holme. The Studio, London.

Manual Instruction in France and Switzerland. A report to the Court of the University of Wales, by William Lewis. Aberystwyth.

Teachers College Announcement, 1901–2. New York.

MANUAL TRAINING MAGAZINE

JULY, 1901

THE PLACE OF MANUAL TRAINING IN THE ELEMENTARY COURSE OF STUDY.

JOHN DEWEY,
University of Chicago.

As a matter of convenience, the studies of the elementary curriculum may be placed under three heads; this arrangement is also, I think, of some philosophic value. We have, first, the studies which are not so much studies as active pursuits or occupations — modes of activity which appeal to the child for their own sake, and yet lend themselves to educative ends. Secondly, there is the subject-matter which gives us the background of social life. I include here both geography and history; history as the record of what has made present forms of associated life what they are; geography as the statement of the physical conditions and theater of man's social activities. At more advanced stages of education it may be desirable to specialize these subjects in such a way that they lose this direct relationship to social life. But in elementary education, of which I am speaking, I conceive that they are valuable just in the degree in which they are treated as furnishing social background. Thirdly, we have the studies which give the pupil command of the forms and methods of intellectual communication and inquiry. Such studies as reading, grammar, and the more technical modes of arithmetic are the instrumentalities which the race has worked out as best adapted to further its distinctively intellectual interests. The child's need of command of these, so that, using them freely for himself, he can appropriate the intellectual products of civilization, is so obvious that they constitute the bulk of the traditional curriculum.

Looking along the line of these three groups, we see a movement away from direct personal and social interest to its indirect and remote forms. The first group presents to the child the same sort of

activities that occupy him directly in his daily life; and re-presents to him modes of social occupation with which he is thoroughly familiar in his everyday surroundings. The second group is still social, but gives us the background rather than the direct reality of associated life. The third is social, but rather in its ultimate motives and effects — in maintaining the intellectual continuity of civilization — than in itself or in any of its more immediate suggestions and associations.

Manual training, constructive work (or whatever name we may care to employ), clearly belongs in the first group and makes up a very large part of it. Physical activity, the use of the bodily organs, is necessarily a phase of whatever directly occupies and absorbs the child. Plays and games obviously come here. So also do a variety of school resources that we might not at first sight put under this head: such as outdoor excursions, much of the more active observation and experimental work in nature study, etc. In this experimental work it is not so much the objective facts, much less the scientific laws, that concern the child, as it is the direct manipulation of materials, and the application of simple forms of energy to produce interesting results. Much of the meaning of art work with little children would also be lost, if we eliminated this aspect of the direct output of physical energy in realizing ideas. School gardens belong here, too. But it is of the manual training, the work with cardboard, wood, bent iron, the cooking, sewing, weaving, etc., that we have more directly to do. They so obviously involve modes of physical activity that the name used to designate them, "manual training," has been selected on this basis alone. No one any longer doubts the thorough training of hand and eye, and (what is of greater importance) of the hand and eye coördination, which is gained through these agencies. Recent psychology has made it unnecessary any longer to argue the fact that this training of hand and eye is also directly and indirectly a training of attention, constructive and reproductive imagination, and power of judgment. The manual-training movement has been greatly facilitated by its happy coincidence with the growing importance attached in psychological theory to the motor element. The old emphasis upon the strictly intellectual elements, sensations and ideas, has given way to the recognition that a motor factor is so closely bound up with the entire mental development that the latter cannot be intelligently discussed apart from the former.

I do not propose to repeat these arguments, but rather to assume them as both established in themselves and reasonably familiar to the

reader, and go on to inquire whether there is not also something peculiarly appropriate, upon the *social* side, in demanding a considerable part in elementary education for this group of activities.

The idea of formal discipline, of the value of isolated and independent training of the so-called faculties of observation, memory, and reasoning, has invaded both physical culture and manual training. Here also we have been led to believe that there is a positive inherent value in the formal training of hand and eye quite apart from the actual content of such training — apart from its social relations and suggestions. Now, we ought to go deeper than this in our conception of the educational position of the constructive activities. We ought to see where and how they not only give formal training of hand and eye, but lay hold of the entire physical and mental organism; give play to fundamental aptitudes and instincts, and meet fundamental organic necessities. It is not enough to recognize that they develop hand and eye, and that this development reacts favorably into physical and mental development. We should see what social needs they spring out of, and what social values, what intellectual and emotional nutriment, they bring to the child which cannot be conveyed as well in any other way. And to carry the matter to this point, to recognize the substantial value of the educative material of which they are vehicles, is to connect them with social life; it is to conceive them from the standpoint of the social meaning they realize in child life.[1]

The culture-epoch theory in education, and the recapitulation theory in biology, have made us familiar with the notion that the development of life in the individual corresponds to the development of life in the race — that the child achieves, in short years and months, that for which life upon the earth has required the slow ages. In spite of absurd pedagogical conclusions that have been drawn from this doctrine (through overlooking the fact that education is meant to accelerate and enrich this recapitulation instead of retarding and prolonging it), no one, I suppose, would deny to it a certain and important element of truth.

This element of truth, rightly apprehended, has, to my mind, a significant bearing upon the question of the place of manual training in education. The point is that the child, with his untried powers, his paucity of experience, is in much the same attitude toward the world and toward life as was early man. That the child should recapitulate the exact external conditions, performances, and blunders

[1] See my *School and Society*, pp. 21–36.

of primitive man is a ludicrous proposition. That he should assume a similar *attitude* is almost inevitable. The former conception leads to the notion that, since the race had to advance out of the errors of an animistic interpretation of nature to the truth as made known in science, the child must be kept in the mist of a sentimental and myth-enwrapped nature study before he can deal in any direct and truthful way with things and forces about him. The second conception means that it is the business of education to get hold of the essential underlying attitude which the child has in common with primitive man, in order to give it such play and expression as to avoid the errors and wanderings of his forefathers, and to come to the ends and realities toward which, after all, primitive man was struggling.

However, even admitting that this is the proper educational interpretation of the doctrine of recapitulation, what has it got to do with the place of manual training? Just this: both primitive man and the child are decidedly motor in their activity. Both are interested in objects and materials, not from a contemplative or theoretical standpoint, but from the standpoint of what can be done with them, and what can be got out of them. It needs no argument to show that primitive man must have mainly occupied himself with the direct problems of life—questions of getting food, fuel, shelter, protection. His concerns were the utensils, tools, instrumentalities that secured him a constantly improving life. His interest in nature was based upon its direct and indispensable relation to his own needs and activities. His nature-myths, his conception of natural forces as hostile and favorable, his interpretation of the events of his daily life, grew out of this industrial basis. His modes of associated life, family relations, political control, etc., were intimately dependent upon his industrial occupations.

Now, if there is anything at all in the doctrine of recapitulation, it indicates the probability, first, that we shall find the child a reservoir of motor energy, urgent for discharge upon his environment; and, second, that this will be likely to take forms akin to that of the social occupations through which humanity has maintained and developed itself.[1]

In one important respect, however, there is a fundamental difference between the child and primitive man. Necessity, the pressure of

[1] In an article upon "The Culture-Epoch Theory," reprinted in the *Second Herbart Year Book*, I have criticised the Herbart theory of making literature the basis of the curriculum from this standpoint.

getting a living, was upon the savage. The child is, or should be, protected against economic stress and strain. The expression of energy takes in his case a form of play — play which is not amusement, but the intrinsic exhibition of inherent powers so as to exercise and develop them. Accordingly, while the value of the motor activities of the savage was found chiefly in the external result — in the game that was killed or the fish that was caught — and only incidentally in a gain of skill and insight, with the child the exact reverse is the case. With him the external result is only a sign, a token ; it is just a proof and exhibition to himself of his own capacities. In it he comes to consciousness of his own impulses. He learns to know them through seeing what they can effect. But the primary interest and the ultimate value remain in precisely the culture of the powers of action which is obtained in and through their being put to effective use.

If there be any measure of truth in these conceptions, then the forms of occupation, constructive work, manual training (whatever name be given them), which are employed in the school, must be assigned a central position. They, more than any other one study, more than reading or geography, story-telling or myth, evoke and direct what is most fundamental and vital in the child ; that in which he is the heir of all the ages, and through which he recapitulates the progress of the race. It was certainly a gain for educational theory and practice when appeal to personal and immediate sense-perception displaced reliance upon symbols and abstract ideas. But, after all, to have sensations, to receive impressions through sight or hearing, is not the ultimate thing. To do, to perform, to execute, to make, to control and direct activity — it is for the sake of such things that perceptions and impressions exist. Indeed, to see and to hear is more than to have impressions ; to see and to hear is to do, to do in coöperation with head, arm, hand, and leg. It must remain part of the imperishable renown of Froebel that he first of all educational reformers seized upon the primordial significance of this phase of child nature, and insisted upon modes of education which should give it outlet. What his exercises did for the kindergarten, that, and more, constructive and occupation work of various sorts must do for the elementary school.

Hence manual training can never take its proper place in the elementary curriculum as long as its chief aim is measured either by the actual result produced or by the gain in technical skill that comes to the producer. These have their place, but this place is not large enough to cover the territory to be rightfully assigned. The first

consideration must be to give play to the deep-lying motor instincts and demands of the child; to enable him to become conscious of his powers through the variety of uses to which he can put them; and thus to become aware of their social values. To give play, to give expression to his motor instincts, and to do this in such a way that the child shall be brought to know the larger aims and processes of living, is the problem. The saw, hammer, and plane, the wood and clay, the needle and cloth, and the processes by which these are manipulated, are not ends in themselves; they are rather agencies through which the child may be initiated into the typical problems which require human effort, into the laws of human production and achievement, and into the methods by which man gains control of nature, and makes good in life his ideals. Out of this larger human significance must grow gradually the interest in the technical problems and processes of manual training. When the interest becomes of the purely technical sort, then of necessity manual training no longer occupies a central position; it belongs upon the level where all other forms of special technique are found.

When manual training is so interpreted, there is a necessary correlation between it and history and science. Just as man came originally to know nature in its variety of forms and forces through the active dealings which he had with it, through his attempts to modify it to meet his needs, so the child who in orderly fashion directs his motor powers to recapitulate social industries comes to know typical materials and the typical causal forces upon which the outward facts depend. In reassuming the motor attitude of the race, he recapitulates also the motives which induced the race to study nature and find out its laws. He takes the position from which the facts and truths of science are most easily accessible, and from which they have the most vital significance. Correlation of manual training with science is likely to be a rather external and artificial matter where the manual training itself is conducted for technical ends — for ends which lie within itself. But when it is treated as a means of organizing the powers of the child in social directions, its scope is necessarily broadened to take in salient facts of geography, physics, chemistry, botany, mathematics, etc.

Thus we return to the notion of the three groups of studies with which I set out. If I have made myself clear in what I have said, it is evident that manual training, properly conceived, is an inevitable and indispensable introduction to the studies of the second group, to history and geography, as the background of social endeavor. It projects, it ramifies, into these inevitably. It only remains for the teacher to

be alert to these connections and to take advantage of them. It is the conception of formal discipline or a merely specific benefit to be derived from these studies which limits them to any narrower position. The restriction is due, not to their own nature, but to the failure to take a large view of them — failure to see them in their proper perspective. The connection with the third group of studies, those which have to do with the symbols and forms of distinctive intellectual advance, is equally important, even if more indirect. In number work it cannot even be said to be more indirect. Measurement, the application of number to limit form and arrange matters of shape and size, is a necessity. The child not only gets expertness in recognizing and handling certain number facts and relations, but, what is even more important, he gets a "number sense": he gets to be aware of the use and meaning of number; it becomes a reality to him, so that there is a vital motive in his own experience for pursuing it farther. Doubtless an ingenious and wideawake teacher will find natural connections also with the matter of reading and writing, but there is no need of forcing matters in this direction. Upon the whole, the connection here is indirect. But we may be sure that the training of the general intelligence which the child gets, his sense of reality, will arouse an interest in these matters. He will feel their necessity, even if he does not always have immediate motive for using them supplied by the constructive work. These tools of learning have been so integrally associated with productive work in the whole progress of humanity that the momentum which is secured from the pursuit of the latter will surely reflect itself, with increased effect, in devotion to the other.

If the term "primary" in the phrase "primary education" denotes anything more than merely a time element, if it means quality, if it means what is fundamental and basic, then the constructive arts and manual occupations have a claim to be considered distinguishing and characteristic features of primary education.

RECOGNITION OF THE TRADE IDEA IN MANUAL-TRAINING COURSES OF HIGH-SCHOOL GRADE.

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PROBABLY most readers of this MAGAZINE will agree that the manual-training high school has a definite and peculiar field in the work of the educational world of today. And probably, too, most of these will agree that, while it may and possibly should have a share in the preparation of boys for higher institutions of learning — particularly the technical colleges — yet, since the percentage of its students who expect to enter those higher institutions is usually small, its chief function is the education of boys — and girls too — who are to go out from the high school directly into the industrial world.

Now, the writer wishes to disclaim at the outset any intention of advocating the conversion of the manual-training high school into the trade school, as we usually understand the latter term. However well suited the trade school may be for Europe, it does not seem to flourish under the industrial conditions of this country. But the American scheme of manual training as a component part of common-school education, both primary and secondary, is based upon the broad grounds of general education rather than upon the acquirement of a detailed knowledge of one or more particular trades. There are in every trade too many special problems and details, both mechanical and commercial, for any school — even the real trade school — to attempt to teach. Our aim is to give our pupils a general knowledge of the industrial arts, with the correlated sciences, and mathematics, as well as of English and other modern languages.

But the advantages we claim for manual training are not limited to the use the pupil can make of his skill and knowledge of the arts in gaining a livelihood. We believe that, whether such use of his skill and special knowledge is made in after-life or not, manual training is, in itself, of the highest value in general education as a stimulus to mental effort and development. The best conception of modern manual training is, therefore, a training of the mind through the hand as well as of the hand through the mind. The two conceptions are really inseparable, as has been so well pointed out by Professor Scripture in his article in the first number of this MAGAZINE.

But however much or little the latter theory of manual training may be accepted in the educational world of today, it is probably a fact that a large proportion of our boys and girls who enter our manual-training high schools make such a choice, not so much because of the advantages for general education (though it often offers the only means of escape from the dead languages), as of the apparent necessity existing for the pupil to get out into the world within a few years — four or less — and begin to earn his own living. Coupled with this prospect is usually a taste, more or less strong, in the pupil for some one of the industrial arts or sciences; or a belief in the mind of the parent that his son has, or ought to have, such a taste. Sometimes there is no definite recognition on the part of either of such a taste; but, instead, a feeling that, as the professions are beyond reach, and in the absence of a decided inclination for commerce, the best chance for the boy to succeed is in some line of constructive industry; and the manual-training school offers a fairly wide field for a choice which may be made later. The latter class is usually large.

This, it seems to me, is about the situation in regard to the average manual-training high school. Is it a too utilitarian view to take of this modern form of education? It may appear so to those who feel that manual training should have higher aims than the mere preparation to earn a living, or to those who forget that all education is a means rather than an end. We must not lose sight of the fact that secondary manual training, especially where established as a component part of a city school system, is, or should be, primarily for the benefit of the many whose school days end at that point, and who are then to become factors in the industrial life of the community, rather than for the few who have the means and ability to prepare for a professional career.

Now, if it were possible for any considerable number of pupils entering upon a regular manual-training course at the junior year to come with well-defined ideas as to what particular line of industry they wished to follow after their school years are over, it might be possible, by a system of electives, or by developing more strongly those features of the shopwork or drawing which bear most closely upon such lines of industry, to give, at the outset, more thorough practice in those lines without sacrificing the scheme of general education. Thus, if a boy purposed to become a house-builder, he might choose a more extended course in carpentry and joinery, taking the extra time required from some line of work less intimately connected with that business, as machine-tool work. In his drawing, special bearing

might be made upon the elementary principles of architecture — perspective, working plans and elevations, and architectural ornament. If he expected to enter a machine-manufacturing business, some of his joinery and carving might be omitted, and the extra time spent in the machine shop, with a corresponding bias in his drawing toward machine design and principles of mechanism.

Fortunately or unfortunately, the number of pupils in the earlier years of the regular courses of our high schools — whether English, classical, or manual training — who have definite aims regarding a future vocation is usually too small to make such a subdivision of classes as would be unavoidable under such a scheme necessary or desirable. And such an extended system of electives would probably complicate to too great an extent the problems of time schedules and teaching force. But in the upper grades, as the pupils become older and begin to think more seriously of their future life and work, and as the number usually becomes less, the writer believes that such electives could be allowed with decided advantage in many cases. Of course, the foregoing does not apply to pupils preparing for the colleges.

Again, in schools where special students, taking partial or short courses, are admitted, such elective courses, with special time and attention given to a few subjects, are usually both feasible and beneficial. Such pupils also are usually older and more mature mentally, and, in many cases, enter upon such courses with fairly well-defined aims for their future.

Now, a problem often perplexing faces us at this point, viz.: To what extent should we encourage these short or partial courses? Should they be considered as a regular feature of the manual-training system and provided for in the school curriculum; or should they be discouraged, and allowed only in special cases, and for especially urgent reasons? The usual course, as laid out for the manual-training high school, is of four years' duration, and is pretty well filled with a good variety of subjects for both mental and manual training.

We all believe, probably — the writer certainly does — that every boy and girl should be kept in school as long as possible, so long as progress continues; and that nothing should be said or done to give the idea that the full course is not the best course for every pupil, *provided he has the capacity, and the time and means, to pursue it.* But it is a matter of very general experience, wherever manual-training schools are established, especially in the larger towns and cities, and

among the artisan and laboring populations, that there is a class of boys, larger or smaller, often of good mental capacities, who know that they must positively go to work by the time they are seventeen or eighteen years old, and who finish the grammar grades with this prospect before them. Most of such boys would be able to make but little use in life of trigonometry or chemistry, while, to a large proportion of them, the advantages of further training in drawing and one or more lines of shopwork would be a positive and great blessing. Such work as this, the writer believes, should be included in the manual-training field as well as the graduation of the comparatively small number who complete the full course.

The same argument will apply to those entering upon a regular course, who later find that they must go to work before the end of the four years. Much might be said also in regard to the policy of allowing pupils of good character and habits of industry, but who have repeatedly failed in one or two academic subjects, to drop out of a regular into a special course rather than to drop out of school altogether. Such cases are not at all rare in the average manual-training school. But this subject should require a more extended treatment than can be given to it in this article. It is understood, of course, that entrance upon such special courses should only be allowed under certain restrictions as to age, preparation, standing, time, etc., and that there should be no lowering of standards in any course or department.

In such cases as these, particularly, why may we not relax somewhat our attention upon the "educative values" in our shop and drawing courses, and place more upon the immediate *usefulness* for the particular students under our charge — to the doing of some one line of work *well* rather than in spreading our efforts over a large field with the result that the pupil learns to do a little of everything and not much of anything? In order, apparently, to avoid dwelling upon any line of work sufficiently long to become proficient, which tends seemingly to trade education, or in trying to make our full courses fit all classes of pupils, we have gone to the other extreme of trying to cover too much ground, and have given only a smattering of any one of the constructive arts. We cover this considerable extent of ground in the four years at a sacrifice of thoroughness.

Why, for instance, should we insist that a boy entering the school in the second year should not be allowed to start at once in the iron work because he has not taken the first year's course in joinery and

carving? or that in drawing he may not take up a course of machine designing until he has completed a certain number of plates of geometrical problems or perspective? We must bear in mind that we are not now dealing with boys of grammar-school age, whose comprehension of the scope of the work is usually limited to the piece in hand, and for whom each piece is a necessary step in the educational scheme which is continuous from the beginning to the end of the course.

It may be remarked, in passing, that this lack of thoroughness is usually the ground — whenever it is based upon anything above sheer prejudice — for the antagonism of the trades unions and organized labor generally which manual training has had to encounter in most localities in times past or present. It must be said, however, that this antagonism is not commonly shown with a very clear conception of the general aims of manual training, and is usally far too sweeping.

But whatever the plan we follow for our high-school boys, we should be certain that our methods are thoroughly up to date and in agreement with the best and most modern manufacturing processes, both as to apparatus and to details of work, so far as the means at our disposal will allow. This does not mean that we should attempt to follow all the short-cuts and economies for cheap and rapid manufacture, discarding hand for machine work, which would be making of our boys mere mechanical factors in manufacturing processes — a condition we so often find and which many deplore in the modern world of manufacture. But it means that each tool used and each exercise or model made should be illustrative, in all details, of the tools and operations used in the best and most modern methods of constructive industry.

The theory that a good workman can be developed with poor tools, if we use the right teaching methods, was never a sound one from either an educational or an industrial standpoint.

How often in shopwork courses — in carpentry, for instance — do we see given as a lesson a joint which not only has no direct bearing upon a complete model or construction piece subsequently given, but which does not even illustrate modern practice in the art, being seldom or never used by practical carpenters and builders, or in which the mechanical principles of construction are entirely lacking! Such an exercise serves simply as a practice piece for the development of accuracy of sight and steadiness of hand — mechanical skill only. This faculty is desirable—indeed necessary, particularly for the class of boys we have been especially considering; but how much more valuable if to this we can add the training of the powers of perception and

planning which come with the application of the skill to actual and constructive problems!

Too often in courses do we see also models of fanciful design and material made for exhibition purposes only — to catch the eye of the admiring layman, but of so little practical value that the pupil himself can scarcely comprehend their use. They often have not even the merits of a good toy. Such articles illustrate the application of art to construction carried to an absurd extreme.

The progressive teacher must keep in touch with the mechanical and industrial world, and acquaint himself with the various changes in tools and processes that are constantly taking place, of which knowledge his pupils should receive the benefit by means of frequent talks or lectures, visits with him to industrial establishments, etc.

No tool or process should be retained in a course after its general use in the mechanical world has passed. Such courses, like the shops employing the obsolete methods, soon become "back numbers." Such an obsolete exercise or process may have a certain "disciplinary value" or use as a practice piece: but mere disciplinary exercises, without practical application, should have no more place in a school-shop course nowadays than in arithmetic or grammar. The same, or sufficient, discipline can be obtained with infinitely greater mental stimulus by a problem having a direct practical bearing.

Why, for instance, should we make so much of chipping and filing in our iron-work courses? Skill in both these operations was exceedingly useful, even necessary, for the general mechanic of a generation ago, when so much of the machinist's work was done by hand. But with the advent of the shaper and milling machine, chipping and filing, as forming processes, have largely passed away; and, even as a finishing tool, the file has been largely superseded by the surface grinder. Practice with those hand tools is necessary and desirable to a certain extent; their use in certain situations can never be dispensed with. But those of our boys who go into a modern machine shop or manufactory after leaving school are likely to handle the chisel or file very little, except, perhaps, for rough work; and it, therefore, seems hardly necessary or desirable thus to spend so much time and energy as is represented in this part of some of our machine-shop courses.

The criticism against our schools, on the part of practical mechanics, of lack of thoroughness in any one line is, no doubt, justified to a certain extent, at least from the trade point of view. Cannot this criticism be done away with, at least in regard to our special students,

or in cases where the line of work may be specialized, by raising the standard of workmanship and by making each exercise or model conform in design and method of construction to the latest and best practice? By thus concentrating our energies on one or two subjects, we may be able to insist upon a higher degree of excellence in the workmanship, even if repetitions by the pupils are made more necessary.

But it is neither practicable nor desirable, if we keep the best educational interests of the pupil in view, that such skill be attained in any one operation or process that he could take his place at once as a skilled workman on an equal footing with experienced artisans in any particular branch of industry. There are, in all special lines of manufacturing, too many details to be compassed in a manual-training course, even if in only one branch of work. But *thoroughness* should be insisted upon at every step; the time consumed should be a secondary consideration so long as the pupil is *diligent*.

This does not mean, however, that the element of time may be neglected if our pupils are to become efficient members of industrial society. The slow-but-sure workman holds a scarcely better position in the race today than the quick-but-careless one. While the product with which we should be chiefly concerned is the boy rather than the piece, yet the boy should be trained to produce his piece with economy both of time and of materials. But accuracy of conception and perception; of measurement, fit, and finish in all details — in a word, *thoroughness* — is the chief lesson to be taught in the manual-training school. Celerity and deftness in any particular operation or line of work may be acquired by practice in after-life; they are largely mechanical accomplishments. But inaccurate or careless habits of thought or action, once acquired, are shaken off again with difficulty. Our watchword should be *efficiency*.

MANUAL TRAINING IN ENGLAND.

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The consideration of the subject of manual training in England must of necessity be somewhat retrospective in order to trace its marvelous growth from tiny beginnings to its present great and important position in the educational system of that country. That its growth there has been marvelous will not, of course, surprise its many and enthusiastic friends on this side of the Atlantic who have themselves been witnesses of the enormous expansion of ideas on the subject and the almost general conversion of educators to a belief in its value in what, in the history of education, is an incredibly short time. I propose to consider manual training chiefly as it affects the "common" schools of England, and, as its official status as a subject of education dates back but a brief ten years, it is possible to get a fairly comprehensive survey within reasonable limits.

For many years previously the "carpenter's shop" had been an adjunct of the great "public" schools and colleges, and the value of some sort of constructional work, though mainly of a recreative and wet-half-holiday type, had been recognized. It was, nevertheless, no part of the school work, and, indeed, figured in the prospectus often as an "extra," and generally was included in the same category as swimming, drill, and other gymnastic exercises. No sort of educational progression or thought entered into the work, which oftener than not resolved itself into the construction of more or less elaborate "cabinets," etc., to be carried home triumphantly at the end of the term to admiring parents. The precise contribution of the pupils to the workmanship of such articles is an unknown quantity, and, in fact, from the nature of them, the pupil's own labor and skill bore but little part in their evolution. Even that, however, has, I believe, borne its fruits, and, when in after-years "my lords of the Council of Education" had under consideration the introduction of manual training into the curricula of the common schools, who can tell how the memory of the Saturday afternoon spent in the carpenter's shop of their school or college may not have influenced some of them in favor of putting such training within the reach of all?

It was, perhaps, early in the eighties when the faint murmurings of the coming movement began to be coherent. Stray teachers here and there had heard of the Nääs Training School, and some in curiosity had taken one of the short courses at Herr Salomon's now famous institution. To the vast majority of teachers and educationists the subject was still, however, quite unknown until the issue in 1884 of the report of the "Royal Commission on Technical Education" brought it prominently before the public. Their inquiry had lasted for some three years, and during that time the subject had made great advances in European countries. Important confirmation of the value of the instruction was also obtained from the United States, and amongst other familiar names may be mentioned those of Woodward, Runkle, and Ham as giving evidence in support of their contention. Finally the commissioners recommended that "proficiency in the use of tools for working in wood and iron be paid for as a specific subject" by the government department of education, but that "as far as practicable such instruction should be given out of school hours," showing that even then the real function and meaning of such teaching were not fully appreciated. In one respect, however, the report had a great influence on the future of manual training in England—the importance of combining drawing with workshop practice was insisted on. When some six years later the first regulations for the carrying on of practical manual instruction appeared, this had effect in the proviso that the bench-work must invariably be connected with the pupil's own drawings, a rule which has remained in force ever since. The immediate results were not very apparent; a few efforts appear to have been made to establish it in some sort of way until, in 1886, at the meeting of the British Association for the Advancement of Science, a paper was read by Sir Philip Magnus strongly advocating the claims of manual and practical instruction as a subject of school work What was, perhaps, more directly useful, he also gave some ideas of its methods and probable cost. Sir Philip had been a member of the Royal Commission and formed his conceptions of the value of the work from a lengthy tour of observation of schools and systems of continental Europe, being greatly impressed by what he saw in France especially. He was then (and still is) the organizing secretary and practical head of the newly formed City and Guilds of London Institute for the advancement of technical education, and was well known also as a teacher and lecturer on school matters; hence his paper attracted great attention from educators and the public generally. The London School Board, which has always

been fortunate in having a number of cultured and intelligent men in its ranks, took the matter up, and Sir Philip was called in to advise them. Of course, the first difficulty confronting them was the obtaining of suitable teachers, able to give the necessary instruction, and sufficiently skilled to undertake the new work. To meet this demand a class was started in the Central College of the City and Guilds Institute, and several teachers took advantage of it and qualified as instructors. In January, 1888, the first lesson was given, six centers being opened in various parts of London in connection with the schools of the Board. An enormous amount of interest was evinced in the experiment, and teachers, school managers, and educationists of all sorts gave it their serious and critical attention. Visitors from all parts of the kingdom and from abroad came to observe and report upon it, and the general consensus of opinion was that the new departure was a success beyond the hopes of its most sanguine advocates.

The various attributes which we are accustomed now to claim for manual training (so much so that in speaking or writing of them to teachers of it one feels a danger of being so trite as to be commonplace) were all proved most conclusively to belong to it. More important still, that bugbear, which we have all experienced in introducing manual training for the first time into a school system, the fear of its interfering with the purely literary studies, proved to be groundless.

It was not yet plain sailing, however, for, to the intense disappointment of its enthusiastic friends, the Department of Education decided that such teaching did not come within the scope of the elementary-schools act, and therefore that the London School Board could not legally expend public moneys on it. At this critical juncture some of the wealthy "City Companies," the survivors of the crafts guilds of the Middle Ages, came forward and offered to provide for the maintenance of the work for another year. The offer was accepted and a committee formed to manage, consisting of representatives of the City and Guilds Institute, the Companies, and the School Board. By that time her majesty's inspectors had become fully convinced of the value and utility of the instruction, and, in consequence of their favorable reports, the 1890 code of regulations for the management of public elementary schools contained rules and conditions under which the teaching of woodwork was recognized as a school subject. Some suggestions were made as to framing courses of instruction, and a proviso that the tools must be "those in use in the ordinary handicrafts" shows that the Swedish knife started out badly handicapped on its

educational career in England. On the issue of the code, the subject was at once taken up by many large centers of population, and a demand arose at once for teachers. Those teachers who had taken a qualifying course of work were all too few, and in consequence all sorts of men were engaged, some workmen only, with no knowledge of the methods of teaching or of child-life, and others with some amount of training in the technical schools established all over the country some years before, through the efforts of the City and Guilds Institute. The character of many of the courses was, in consequence, largely of a "technical" or trade nature, and consisted for the most part of joints and abstract exercises in various tool manipulations. This idea was in many cases fostered by the officials appointed to inspect manual training, the drawing inspectors of the Government Department of Science and Art. In those days the inspectorate was largely recruited from officers of the Royal Engineers, excellent draughtsmen, clever and able constructors, but unable from the nature of their own training to depart much from the constructional units as taught in the government military colleges. Under the pernicious system of "payment by results" then in vogue, that is, the payment of grants by the government according to the quality of the work done by the pupils, the duty of these inspectors was to examine and report upon the whole of the drawing in the public elementary schools, and, as drawing formed an integral part of manual training, that also was put under their jurisdiction. In their hands, the advocates of the Swedish system, pure and simple, were hardly dealt with, and although here and there men were found honestly attempting to teach on what they considered to be the best principles for children, the making of "models" or useful articles, their courses of work had to be liberally sandwiched with "joints" to satisfy the demands of the examiners, who assessed the value of their work for grant-earning purposes.

About this time two associations of teachers were formed. One, the National Association of Manual Training Teachers, chiefly consisting of men engaged in teaching the subject under Mr. Barter, of the London School Board, together with a few scattered members in the rest of the country; the other, the Sloyd Association, formed, for the greater part, of men who had taken the Nääs course and their pupils. This latter was not numerically strong, but, like the National Association, had some leading educationists in their ranks. The aim of both was to disseminate knowledge of the subject and generally to assist in forming public opinion on the matter. They also watched

all legislation affecting manual training and its kindred subject, "technical" or specialized education, and when necessary took action in the interests of the work and its teachers. From the first a strong stand was made for freedom in drawing up courses; educational principles first, no matter what the particular expression of these principles, whether "models" or abstract exercises. At first many of the government inspectors insisted on a set examination at their annual visit, but after several years' experience the absurdity was seen of treating the children as individuals during the training, and then trying to measure each one by the same wire gauge, as it were, at the year's end. Gradually the more enlightened of these officials dropped their fixed tests and *inspected* instead of *examining* the children, noted their intelligent (or otherwise) work, and came to be regarded by the teachers more as friendly advisers than as "policemen" ready to catch them tripping.

In April, 1898, the two great divisions of the English Government Educational Council, the Department of Science and Art and the Education Department, were merged into one Board of Education. The control of the manual training was vested in four specially selected inspectors, and the whole country divided into four districts under these gentlemen. The grant was changed from so much (2 *d.*) per lesson to a lump sum of six or seven shillings per annum, accordingly as the report was "good" or "excellent." With an experience of nearly two years of the working of this, most teachers consider the scheme eminently satisfactory. The broadening of the views of the inspectorate, from the constant diversity of thought and practice in the various schools visited, has had excellent effect, and must have good results for the cause of manual work. As mentioned earlier, the importance of the drawing being directly connected with the bench-work is everywhere insisted on, and, as in the United States, the advocates of the Swedish system have fallen into line with this. In fact, there is a general coming together of all earnest workers and thinkers in the matter, and the great points of difference so much insisted on by devotees of this or that "system" are slowly, but, I believe, surely, disappearing. Professor Robertson, the moving spirit and originator of Sir William C. Macdonald's great scheme for introducing manual training into Canada, who has observed, perhaps more closely than any other man, the workings of the methods of the English schools, declares, as the result of his investigations, that he could discover little or no difference in the various "systems" in vogue there. In the elementary schools

the subject is still an optional one, and it is inspiring to note that about sixty of the largest towns and school boards have adopted it in their schools. In London Board Schools alone bench accommodation is found for close on 55,000 children. In England last year the grant was paid on nearly 100,000 children. In addition to these, many others received the instruction, but were not qualified for the grant, owing to their not having attended with sufficient regularity to complete the course. In the "Organized Science Schools" claiming government aid, manual training in wood or metal has been compulsory for some years now. Last year "higher elementary" schools were established to bridge the gap between the common schools and the organized science schools, and in these it is also compulsory for boys, and some form of it for girls.

In the grades or "standards" of the common schools, below the age at which woodwork may be reasonably taken, the adoption of hand-work is at present by no means general. Some of the large cities have formulated good and comprehensive schemes by which the "occupations" of the kindergarten are carried on in various advanced forms until the woodwork is reached. Chief among those cities must be mentioned London, Birmingham, and Leeds. Their schemes of work comprise paper-folding and cutting, clay-modeling, wire-bending, bricklaying, cardboard modeling, brush and color work, etc.; and these are being gradually imitated in other districts.

By means of exhibitions and conferences much good work has been done in this direction, and on all sides the movement is still spreading and growing. The outlook seems full of hope, and if those in whose hands the future destiny of the movement largely lies be but true to their faith and principles, it must tend to the uplifting and bettering of our race.

Some words of a "greeting" of Herr Salomon, sent to the National Association of Manual Training Teachers' Conference in London last year, will, I think, fitly conclude, and will help to emphasize what, in my opinion, is the most hopeful sign in the sky for our work in the future, the coming together of apparently diverse methods and of seemingly opposing elements. He said:

> The manual-training movement is, like every other similar movement, a thing which is composite to a high degree. If, for example, we stand at Gravesend and watch the Thames roll its mighty wave along, the immense stream appears as a something whole, and as far from being the composite stream it really is. For, in reality, it was at the beginning something comparatively unimportant, arising, as it does, from the union of several springs

in Gloucestershire, if I mistake not. The greatest river of England, which has borne and will continue to bear on its bosom the greatest riches of the world, is scarcely navigable for the first miles of its course; but by degrees its tributaries carry to it more and more water. It runs onward, becomes broader and deeper, receives tributaries from the one side and from the other. It is changed from a rivulet to a rill, from a rill to a brook, from a brook to stream, from stream to river—to the river Thames—one to all outward appearance, still it is in reality many. Now, it seems to me that this manual-training movement, or whatever we may like to call it, just resembles such a mighty stream, which, to the casual glance, may appear a something simple and indivisible, but which upon closer examination is found to be as compound as anything could be. It has, it seems to me, its first cause in the desire of the child to be at work—to be executing something. Then it has, during its silent course, received the one tributary after the other—the *national-economical*, or such as once again brings to the fore the old-time work in the home; the *technical*, which strives to bring back skill in handiwork, which has been lessened not least by machine industry; the *social*, which elevates bodily labor in popular esteem, and the workman too; the *ethical*, which strives to lift the moral standpoint by flying idleness, which has been called by Comenius "the devil's pillow;" the *physiological*, which endeavors, by means of bodily labor, to realize the ideal of your great countryman John Locke—"a sound mind in a sound body;" the *æsthetical*, such as trains the eye to be able to understand the beautiful in form and execution. Thus, while the stream has flowed sometimes beneath precipices, now through fruitless marshes, so through grass-grown meadows, and again mid fertile plains and smiling parks, it has now, having reached the metropolis of the world, become the mighty river of educational art which has taken to itself a multitude of different streams, and bears upon its wave a great crowd of human thoughts and opinions. For this, too, has ever been my settled opinion, that, as it is a certainty that the future belongs to youth, so surely ought each religious, political, social, and economical question be finally resolved as one of education. The one who has had occasion to follow the movement which you describe by the name of "manual training," and I by that of "pedagogic sloyd," knows that, even if we differ in details more or less essential—if you more strongly emphasize one side, and I another, of this mighty movement—he knows, I say, that in reality we both strive toward the same goal; we struggle and are carried forward to the common estuary—the development and improvement of youth, and, with it, of all humanity.

THE DECORATIVE SIDE OF A COURSE IN FORGING.

I.

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Pratt Institute, Brooklyn, N. Y.

In writing this series of articles my main object will be to show how various typical decorative projects may be worked out by high-school students. I will go into detail rather fully, taking up each process step by step and illustrating any special tools used in getting out the work. This will doubtless prove a very old story to many of my brother-teachers; but if it proves helpful and suggestive to some who are not in cities where they can see this class of work done, I shall feel that my effort has not been profitless.

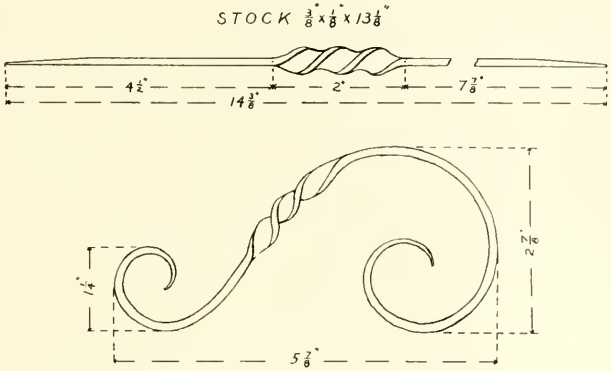
The fundamental operations in forging are very few in number, and they may well be taken up in the following order: drawing, bending, twisting, shouldering, upsetting, punching, splitting, welding, and forming; and, for decorative work, veining and modeling. A good course will contain type pieces of machine forgings, which will give practice in these different operations, and the most important ones, such as drawing, bending, welding, and forming, will of necessity be introduced several times. Veining and modeling, or raising, we shall consider as essentially decorative processes in which the boys have possibly had some previous training in their sheet-metal work. So, with simpler forms—such as escutcheons—these processes may be taken up after twisting or shouldering, if we wish; but the more ornate foliage work should not come until later in the course.

The problem now under consideration is to introduce into a course as outlined above, at suitable periods, exercises of a distinctly decorative character, which will embody these fundamental operations. If the original course is designed to cover a specified time, judgment must be used as to what exersises shall be omitted in order to get in the decorative work; but I believe it is considered by most of the leaders of thought in the manual-training field that such an omission is wise.

The decorative work should follow the course rather closely in the beginning, but, as more comprehensive projects are made, they will be found to combine so many different operations that their position

in the general course may be shifted more or less as may prove advisable from year to year.

Our boys, then, will begin their work in forging with one or two practice pieces which will serve mainly to give them their first experience in building and keeping the fire, handling the iron and tongs, and most of all in striking with the hammer. This will be followed by simple machine forgings, introducing drawing, bending and twisting. They will then be prepared to embody these operations in their first decorative project.



SKETCH FOR BLACKBOARD

FIG. 1.

For this first piece I will take a simple S-scroll with a twist at the change of the curves. In presenting this to the class I use the blackboard (fig. 1) to give necessary dimensions for drawing down and laying off the work, and for each boy I mark out a pattern on a small pine board from a model scroll which has been set down to a plane surface on one side. Where many working patterns are required, this plan has proved a great time-saver over others (such as mounted paper tracings or curves scratched on slate or sheet iron), for, when made indistinct by use, we simply plane off the surface of the board, quickly run our pencil around the model, touch up the ends to make them quite definite, and the block is again ready for use. Everyone in the class makes this scroll, the stock for the exercise being cut to the proper length beforehand. Each student works carefully to get the correct over-all length when both ends are drawn down. After being carefully laid off—with the prick-punch marks on the edge of

the iron—the twist is made; then the scroll is bent up, great care being used to get the short curves well formed; and lastly all of the curves are trued up until the boy has worked out the very best lines that it is possible for him to produce with the practice he has had thus far. One cannot say too much in regard to urging the boys to judge the scroll by their eye and to use the pattern simply for over-all dimensions; for in this way we can do much to give that training in judgment and appreciation of beauty which is the aim of all this side of the manual work.

FIG. 2.

A few boys in each class will always finish their exercise much in advance of the others, and I allow these boys to begin a larger project upon which to work whenever they find themselves ahead of the class (fig. 2). For such projects I make one working drawing, then trace off full-size details upon heavy manila paper, and tack this to a board. The boys measure the curves, make their allowance for drawing, and cut their own stock.

Now, as to details of shop practice, let us consider in order measurement of scrolls, cutting stock, drawing ends, twisting, forming the curves, and fastenings.

There are two convenient methods of measuring a scroll — either step off the curve with dividers set to a definite small arc and keep count of the steps, or measure direct with a flexible wire. In general I consider the latter method preferable. Use a fine annealed wire of definite length, bend it to fit the curve, beginning at the inside or eye of the scroll, and, where it is desired to stop the measurement, bend at a sharp right angle. Now, at the figure on a rule corresponding to the original length of the wire place the end of the unused portion (fig. 3);

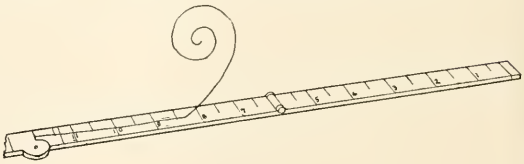


FIG. 3.

the true length of the curve may be read direct from the rule at the right-angle bend in the measuring wire. In this way it is unnecessary to straighten out the curves of the measuring wire, and the wire can in turn be adjusted quickly to all the scrolls of a design. On large projects it is well to set down against each separate scroll on the drawing a memorandum of its length.

In cutting the stock the size of the iron and the style of end that is to be formed must be considered. With ends simply rounded full length is used, but where the ends are tapered or forged in any way the stock is cut shorter to allow for the increase in length due to such

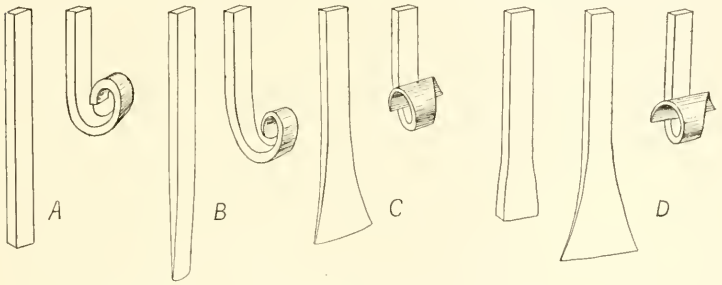


FIG. 4.

A — Blank not forged.
B — Blank drawn to straight taper.
C — Blank flared.
D — Blank upset, then flared. Stock ¼" × ½" ; same length in each example.

treatment. For instance, with ⅜ × ⅛-inch stock we deduct ⅝ of an inch for each taper. The best way to determine the proper amount to deduct is to form the desired end on a piece of scrap stock and note the increase in length. The accompanying sketch (fig. 4) illustrates the idea of the relation between the blank stock and the forged end.

The twist is usually a purely decorative feature in any design and breaks the monotony of a continuous line by the introduction of a series of short parallel elements of a very subtle nature. A twist of two inches, like that called for in the exercise before mentioned, can be turned cold and give smooth regular lines. The work should be gripped in a vise, whose edges are not too new and sharp, close to one of the prick-punch marks; use a wrench or pair of tongs at the other punch mark and give the bar one and one-half turns. If, in doing this, the work becomes bent, rest it on a block of wood and straighten by blows of a mallet, as the use of the hammer and anvil would mar the edges. A high heat will give a close twist suggesting a screw

thread. I think the most pleasing effect, and that having the greatest life, is obtained when the heat is brought up carefully so as to be red for about ½ inch in the middle and black at the punch marks when the twist is made. In this way the increasing stiffness of the metal in each direction from the middle gives a variety and character to the work, which are lacking when the whole length to be twisted is at a uniform temperature. In making a long twist the iron should be worked cold whenever practicable. An allowance must be made for shortening which will occur, varying from ⅛ inch to ¼ inch per foot, according to the size of the stock. The best plan is to allow plenty; make the twist and then lay off the desired length. In a case like this the aim is to have the twists as uniform as possible, and any irregularities may be easily adjusted by using a pair of bending wrenches, or even two pairs of tongs, to shorten or lengthen any particular twist. In truing up large flat or square stock it is necessary to heat the part that needs adjusting and cool off each side up to the offending curve by pouring water from a dipper; then put in or take out the twist, as the case may be. For bending a twisted rod grip a piece of hardwood in the vise and use it as the horn of the anvil, using a mallet in place of a hammer.

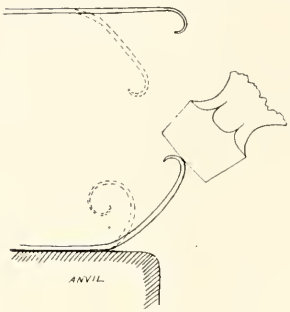


FIG. 5.

In bending the scroll three general operations are performed: first, forming the eyes; second, bending the longer curves which block out the scroll; and, third, truing up. The work is carried through in this order, except that the short curves of the eye are trued up when first made. In the class exercise under consideration the eyes are designed especially to be formed partly over the point of the horn. In order to get good curves in the first step we depend upon the varying stiffness of the iron — both from its tapered form and from a gradation of the heat, the extreme end being the hottest. This end is first given a short curve over the point of the horn, then projected over about 2 inches and bent down to an angle of about 45 degrees; the piece is then turned over, rested on the face of the anvil, and with skillful blows

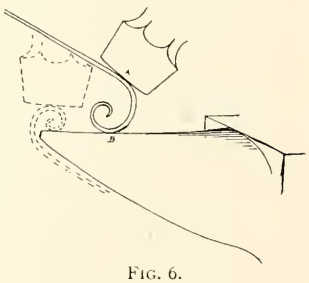


FIG. 6.

of the hammer made to roll up to the desired curve (fig. 5). With a little practice these steps may be repeated for another length of stock in the same heat and a very considerable portion of the scroll formed with only the hammer and anvil. Should the eye thus formed be a little large, it can be closed evenly all around. To do this rest it on the point of the horn, with the body of the stock projecting in line with the horn and strike carefully on the outside of the curve while the end is being slowly rolled around as shown in sketch (fig. 6). (This result can also be obtained in some cases by laying the work on the face of the anvil and pinching the eye carefully with a pair of flat tongs.) The principle of the action described, I take it, is that the impact of the blow at points A and B (fig. 6) straightens the short curves slightly and at the same time gives greater curvature to the stock between. This principle is taken advantage of to true up the eye before proceeding farther with the bending—the method being to rest one short part in the curve on the point of the horn and strike a light blow on another similar defect, bending the intervening stock. Before passing from this step I wish to call attention to the two forms of bottom tools shown in sketch, as they are very helpful in forming these short curves with the hammer (see figs. 7 and 8). They do service the same as the horn, with the advantage that the recess allows the end curves to be rolled to quite a good size under the working edge of the tool without interference. These tools are very simple in construction, and one to every four or five boys in a class will prove of great convenience.

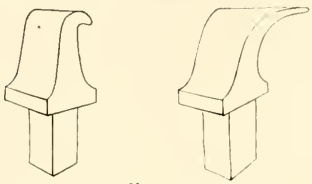


Fig. 7.

Fig. 8.

The bending tools possibly warrant a brief description before considering their use, which is almost self-evident. Those made to be

held in the vise or anvil I term bending blocks; those having a handle, bending wrenches. Of the bending blocks (fig. 9), A and B are forged from soft steel and the slots case-hardened. They are very strong and serviceable. Figs. C and D are made by shrinking round pins of tool steel into soft steel blocks. In one case this block is simply cut from the bar and in the other it is forged to fit the square hole in the anvil. These latter can be very quickly made, but they are not so durable as the forged ones.

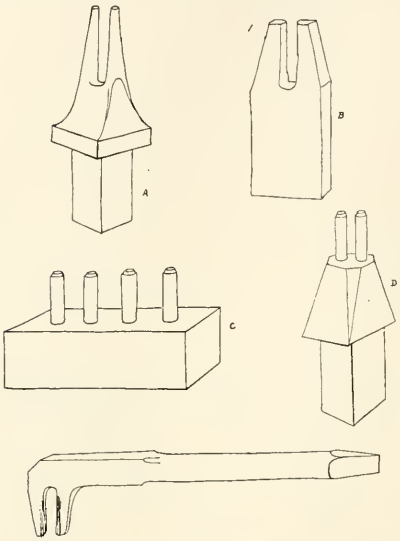


Fig. 9.

The wrench is also forged from soft steel and the head case-hardened. The width of the slots should be about one and one-half times the stock to be bent. Of the use of the screw-driver point on the wrench handle I will speak later. There should be at least one set — a bending block and wrench — for every two boys in the class. It would be better for each boy to have a set.

In blocking out the scroll this thin stock may be bent cold, using only the bending block. The iron is caught between the pins and bent a little at a time by hand. A very low heat, however, will facilitate matters, in which case the work is held in the tongs and rested between the pins of the block, while the curve is worked in little by little with the wrench. By these means we get the scroll worked out in a general way.

Fig. 10.

In the third step we go over the piece carefully, adjusting the curves

until we get a satisfactory result (fig. 10). This truing up requires great patience, and the student must be systematic, first taking out the short curves,[1] then improving the long ones. The boys must be cautioned against trying to do too much at once, as a slight bend will alter the whole curve very materially. And, above all, let me suggest again that the boys be urged to work in as free a way as they can, so that their scrolls, aside from certain fixed dimensions, will be products of their own creation.

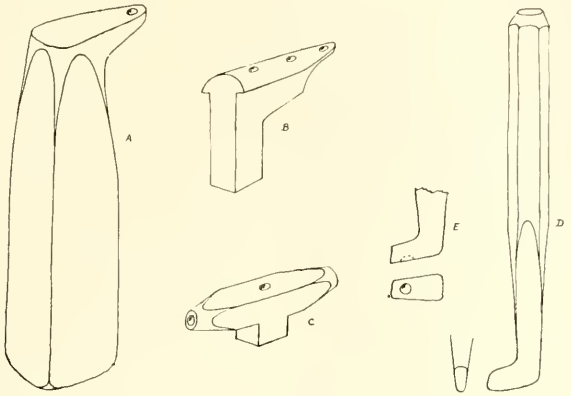


FIG. 11.

I shall say but little with reference to fastenings used for joining scroll work. I use No. 10 round-head rivets for the $\frac{1}{8}$-inch stock, with $\frac{3}{16}$-inch and $\frac{1}{4}$-inch for larger work, my idea being to keep as few sizes as possible in stock. In fig. 11 I give sketches of rivet blocks and sets which I have found convenient in constructing scroll-work projects, and these need little explanation. A is made heavy enough — about five to eight pounds — to be held by hand, or it may be gripped in the vise if convenient. B and C are vise blocks. B is gripped with the top shoulders down against the vise jaws and the end cup projecting enough to catch the rivet; or it may be gripped at right angles to the jaws when the other holes prove convenient. C is

[1] In this article I shall speak of a true curve — meaning the curve desired; of a short curve — one with a short radius or one having greater curvature than desired and of a long curve — one with comparatively long radius or one with not enough curvature. I shall use the term "eye" referring to the series of short curves in the middle of a volute scroll.

gripped at right angles to the vise jaws, its projecting foot holding it firmly; or it can be held vertically to bring one of the end cups into service. D is an offset riveting tool, and E shows the foot of an offset cupping tool. These are used for upsetting and finishing rivets in

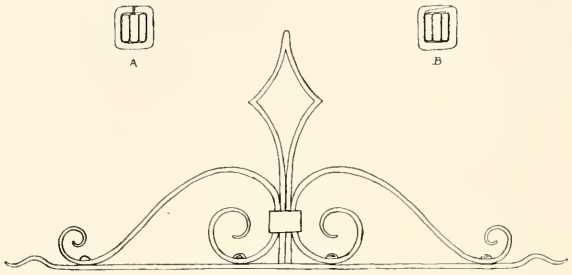


FIG. 12.

places where it is impossible to bend the scroll out of the way to allow the use of the hammer itself.

I use machine screws only where it is very awkward to put a rivet, or where it is desirable to have the work constructed so that it may be taken apart readily. I use mainly No. 8–32, No. 10–24, and No. 14–20. I have taps and dies for these sizes, and clearance and tap drills; the latter are kept in a block made expressly for them; they are marked distinctly and used only in connection with the taps and dies.

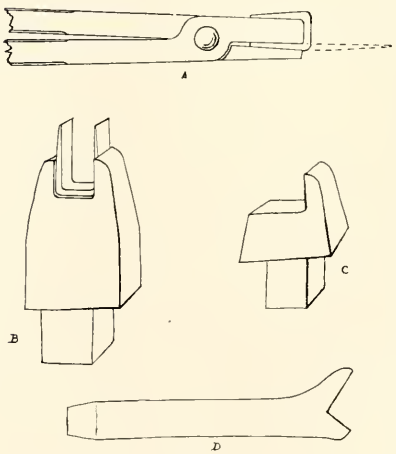


FIG. 13.

For drilling holes I use a No. 6 Goodell breast drill, and I find that with a sharp twist drill and lard oil the boys can drill rapidly through stock up to $\frac{3}{16}$ inch; for heavier drilling the boys use the drill press in the machine shop.

Another fastening which is very attractive in certain designs is the simple band (see fig. 12). This is made of the same stock as the scroll work. It is cut to such a length (determined by experiment)

that the ends will just meet, as at A, fig. 12, or each end is drawn down and made to lap, as at B, fig. 12. This latter method looks neater when nicely finished, and is the easier of the two for the boys to make.

The bands can be made by bending over the horn and squaring up on the hardy, and may be put on by gripping them cornerwise in the vise and closing over with hammer. A few simple tools, however, will facilitate matters very much.

The clip tongs A, fig. 13, are made with one jaw the exact thickness of the pieces to be clamped by the band. The stock for the band, previously prepared, is heated, gripped firmly at the proper distance from the end, and the extending length formed over the jaw of the tongs, as shown.

In fastening, the seat-tool B, fig. 13, receives the band, the work to be clamped is slipped in, and the ends of the band folded down with a hammer. In case the bands do not grip the work firmly enough, a seat-tool, C, fig. 13, and a clamping stick, D, fig. 13, will be found very useful for tightening them.

A YOUNG LINDEN.

LEAF-FORMS OF OUR COMMON BROAD-LEAVED TREES
V.

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IT is a difficult matter to decide which is the best season in which to study the trees. Perhaps winter is the least interesting time, although the trees are far from being uninteresting in winter. It certainly is the best period to study the bark, as the light which is received at this time of year is less obstructed by foliage shadows, etc.

The spring must not be neglected, for this is the time of miracles, and one may miss some of the most interesting operations in nature. Surely we cannot let the summer season go by without continuing our observations, as every few days bring a new set of conditions, and everything is hurrying toward fruition. While autumn is the great harvest season and the vegetable world, like the waning day, ends as the sunset in a blaze of glory.

If, then, one is to become interested in this subject, he must make it a part of his daily life, and it will well repay him by making the

world for him one of continual brightness and sympathy, the same world which is so often dreary and uninteresting to those who are unacquainted with nature.

The lover of trees is often reminded of the statement that the Creator never duplicates his work. Not only are no two leaves on the same tree alike, but the great diversity of forms leads him to surmise that nature like man is decidedly moody and capricious. For instance, on the sassafras tree, which is occasionally found fifty feet high,

SASSAFRAS.

although there are three distinct kinds of leaves, each of these is as regular and conventional in shape as an art student could make it.

On the red mulberry tree, which may be growing side by side with the sassafras, no two leaves will be found alike either in shape or size. Evidently nature was not in the same mood when she developed the mulberry as when she designed the uninteresting three-pointed sassafras.

From this point of view — oddity of leaf-form — two American trees stand out prominently, the Kentucky coffee tree and the Hercules club, angelica tree, or devil's walking-stick, as it is variously called. Both of these trees bear double compound leaves, *i. e.*, leaves in which the leaflet is itself compound, there being but one other tree in this class growing in the United States, viz., the honey locust.

The Kentucky coffee tree takes its name from the hard black bean which it produces. The legend recounts how the pioneers from Virginia, pushing through the Appalachian passes into what is now

RED MULBERRY.

KENTUCKY COFFEE TREE

HERCULES CLUB

ANGELICA TREE

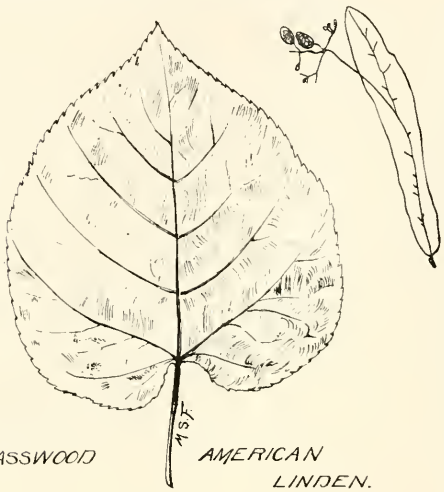
Kentucky, were without many commodities, including coffee, and that the fruit of this tree was used as a substitute until genuine coffee could be obtained. There are from six to nine of these beans, about the size of chestnuts, growing in a lima-bean-shaped pod from six to ten inches long. These pods stay on the tree all winter, and, as the tree has a very bare and dead appearance after the leaves are off, they are a strik-

AMERICAN LINDEN OR BASSWOOD, SHOWING THE SUGAR-LOAF FORM.

ing feature long remembered. The tree is rather rare in the North, except in parks, where it is planted for its oddity, and grows to a height of a hundred feet. It is a very interesting member of the pea (locust) family, and its leaf, which measures three feet by two feet, is very symmetrical and interesting.

The doubly compound leaf of the angelica tree is even larger than that of the coffee tree, a specimen in the possession of the writer measuring forty-one inches in length. The tree itself, however, is a mere shrub in comparison, rarely reaching over twenty-five feet in height. It takes its names, "Hercules club" and "devil's walking-stick," from its peculiarly bare and club-like appearance when the foliage has

disappeared in the fall. As there are no small twigs or branchlets, it is a mere stick. The leaf may easily be distinguished from that of the coffee tree by the facts that it ends in a single leaflet instead of two and by its lack of independent single leaflets near the base of the petiole. The fruit consists of large drupe-like clusters of small purple or black berries about the size of elderberries.

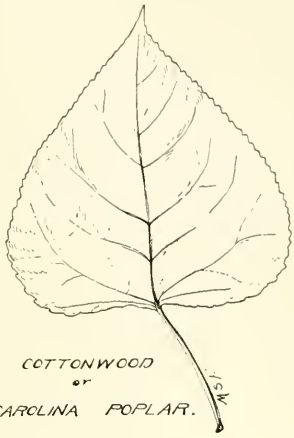


A very valuable group of trees for both shade and timber are the basswoods or lindens. There are several varieties, the European linden thriving here as readily as the native varieties. These trees may always be distinguished by the leaves, which are heart-shaped and lopsided, *i. e.*, one side from the mid-rib being always larger than the other, as if two leaves of different sizes had been joined along the center. This is a very common feature among certain classes of trees, as, for instance, the elms and hackberry. Another distinguishing feature is the bract or seed, as shown in the sketch. This tree is valuable from every point of view. Its symmetrical shape, dense shade, fragrant flowers so loved by the bees, and its timber so free from knots and valuable in many trades, commend it in every way as a typical American tree.

Another valuable group from as many points of view is the ash family. Handsome, tall, clean-cut boles, fresh healthy green foliage, and valuable hardwood timber are words easily spoken or written, but one must have a personal acquaintance with individual trees to appreciate their true significance. The white, red, blue, and black varieties have slight differences in foliage, seeds, and general appearance, of which our space does not allow an extended description. The wood of all is hard, strong, and elastic, and is used extensively in the manufacture of oars, carriages, and agricultural implements.

In the willows and poplars we have two groups, widely different, yet possessing valuable features from several viewpoints. It seems to the writer that the willows have never been fully appreciated. Their

RED ASH



COTTONWOOD
or
CAROLINA POPLAR.

mobile and softening effect among such stiff and sturdy trees as the oaks and tulips is very agreeable when one is looking for diversity in the landscape, while as to their having a mournful effect one is

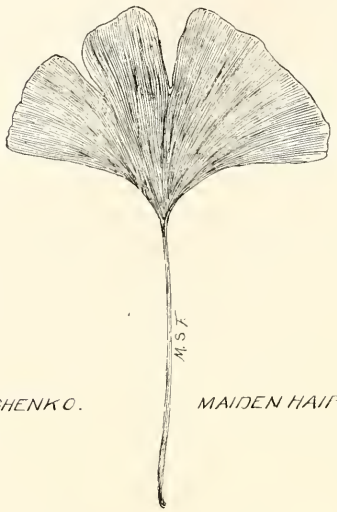
ASPEN.

ASPEN POPLAR
or
LARGE TOOTHED ASPEN.

strongly inclined to say, "Look again." They are certainly infinitely superior to those maimed and distorted monstrosities of tree life known as weeping-beech and its kind.

We are indebted to the poplars for the spire-like Lombardy, whose excessive use has been followed by the natural reaction, with the consequence that its legitimate use of enhancing and diversifying groups and sky-lines has been practically forgotten and the tree is becoming scarce.

To this group also belong the white poplar, aspen and large-toothed aspen, balm of Gilead, and cotton-wood. The wood of this group is of little value except for fuel and paper-making, but as shade trees two or three varieties are valuable in the trying conditions of city life, and the cotton-wood in the past has been a Godsend to some portions of the western prairies, where it was practically the only tree growing wild. The foliage of the whole group is remarkable for its constant movement with the slightest stirring of air, and this is due to the long, slender, flat stem.



GHENKO. MAIDEN HAIR TREE

We are indebted to Europe and Asia for some very interesting and valuable trees, but none of these surpasses in interest the ghenko or maiden-hair tree. It is claimed by scientists to be a survivor of the carboniferous age, and the impressions of its leaves are still found in coal. Its leaf is fan-shaped with parallel veins—an unusual thing in a tree leaf—and it is thick, leathery, and of a beautiful green color. There is absolutely nothing in our native trees with which to compare either the leaf or the general habit of the tree. The general effect is inspiring, as it soon outgrows all its neighbors, every branch reaching upward with the central spire twenty feet in advance of all the others. The leaves keep quite close to the main branches, and as their form is like that of the maiden-hair fern, the effect, particularly by moonlight, is one never to be forgotten. We do not know yet how large this tree will grow in this climate, but in its original home, China, it is said to reach enormous proportions, and, judging by some magnificent

specimens in New York and Brooklyn, it bids fair to outgrow most, if not all, of our native trees.

The shopwork teacher is often at a loss, owing to the small amount of time at his disposal, to know just what classification to use in his talks on trees. The botanical classification is good — in its place — but clearly that place is not the manual-training room. It seems to the writer that the one adopted by F. Schuyler Mathews is at once the simplest and most comprehensive for our purpose. Taking the leaf-form as the characteristic feature, we have the five general divisions:

1. Simple alternate growing leaves.
2. Simple opposite growing leaves.
3. Compound alternate growing leaves.
4. Compound opposite growing leaves.
5. Evergreen leaves of the pine family.

The first four classes, comprising the deciduous leaves, are subdivided into two subclasses each as follows:

1. Without teeth.
2. With teeth.

These two subclasses are again subdivided:

A. Edge not divided nor cut into.
B. Edge divided or cut into.

This gives us the following arrangement:

I. Simple alternate leaves:
   1. Without teeth { A. Edge not divided. / B. Edge divided.
   2. With teeth { A. Edge not divided. / B. Edge divided.

II. Simple opposite leaves:
   1. Without teeth { A. Edge not divided. / B. Edge divided.
   2. With teeth { A. Edge not divided. / B. Edge divided.

III. Compound alternate leaves:
   1. Without teeth. Leaflets bordering main leaf stem.
   2. With teeth. Leaflets bordering main leaf stem.

IV. Compound opposite leaves.
   1. With and without teeth. Leaflets bordering main leaf stem.
   2. With teeth. Leaflets radiating.

V. Evergreen leaves.

ASSOCIATIONS.

WESTERN DRAWING TEACHERS' ASSOCIATION.

THE eighth annual meeting of the Western Drawing Teachers' Association was held at Rock Island, Ill., April 23, 24, and 25. The officers were very fortunate in their selection of speakers for their principal sessions. Mr. Arthur W. Dow, of Pratt Institute, gave an illustrated address on "The Teaching of Art" at the opening session on Tuesday morning. In the evening Mr. Charles Francis Brown, of the Chicago Art Institute, spoke on "Composition in Landscape." Mr. Brown illustrated his lecture with sketches on the blackboard and stereopticon views of paintings by eminent artists, to show correct methods of spacing and other elements in landscape composition. On Wednesday evening Mr. John Duncan, of Chicago Institute, lately from Scotland, gave a most enjoyable art talk. His picturesque and graceful use of the English language added not a little to his clear and logical plea for applied art. On Thursday evening, at a joint meeting with the Northern Illinois Teachers' Association, Professor Charles Zueblin, of the University of Chicago, spoke on "William Morris and His Work" to an audience which nearly filled the First Congregational Church of Moline. Professor Zueblin illustrated his lectures with a rare series of colored lantern slides.

At the session on Wednesday morning normal training in art was discussed from several standpoints: by Miss Wilhelmina Seegmiller, of Indianapolis; Miss Mary S. Morse, of West Superior, Wis.; Miss Annie Lyford, of Moline, Ill.; and Mrs. Hannah Johnson Carter, of Chicago. The Thursday morning session was devoted to "Construction in the Grades." Miss Mary C. Scovel, of Oak Park, Ill., read the first paper. She began by saying that the constructive work in the elementary schools must be connected with the life in the community in which the school was located. As that life is not exactly the same in all places, the constructive work should not be the same. Children should be led to observe and to make use of their observations in their constructive work. Miss Scovel gave a detailed account of how a class in Oak Park took up the study of buildings — churches and dwelling houses — and furniture. She also spoke in favor of bent-iron work, pointing out its close connection with drawing and designing. In speaking of methods and standards she said: "It is a positive injustice to accept careless work. Constructive drawing should be made the basis of making. Drawing and construction combined will force the child to appreciate the value of accurate, careful work."

In the discussion which followed, Miss Cushman, of the University Elementary School, Chicago, said she was glad to hear Miss Scovel emphasize the need of accurate work. She felt, however, that inaccuracy is often due to imperfect directions given by the teacher. Superintendent Whitney, of Elgin, spoke against so much of the pupils' work being left unfinished. Pupils go as far as they can in the given time and then throw their work away. This should be avoided. Mr. Kennedy, of La Salle, could not agree with Mr. Whitney; he thought that if the pupil had put forth his best effort in his work, there was no harm in throwing it aside at the end of the lesson.

"Shall we ever have anything finished till life is done?" Mr. Sylvester, of St. Louis, agreed with Mr. Kennedy, and emphasized the need of keeping the pupil's ideal high. Following the line of thought of the last two speakers, Mr. Dow said: "Too much demand for accuracy kills feeling." Then, quoting Ruskin, he said: "The demand for perfection is a sign of decadence in art." To still further illustrate his thought Mr. Dow told of a Japanese tea-kettle he had once seen. It was made of iron, yet it was an object of beauty. It was beautiful in shape and had a slight flower design around the top, yet it satisfied all the requirements for use. Things need to be no less useful in order to be beautiful.

SOCIAL OCCUPATIONS.

The second paper was read by Miss Clara I. Mitchell, teacher of textile fabrics, Chicago Institute. Her subject was "Social Occupations." She said in part as follows:

"The old ideal of school as preparation has given way to the new ideal of school as society. Society — or community life — is the organization of people for mutual helpfulness. Ideal community life is that in which all its individuals act with reference to the good of the whole, and in which the good of every individual is considered by the whole.

"Such community life has now become the ideal of education, and it means that school shall be organized for the best good of its members; that all its members shall grow into citizenship, or work together for the happiness of the whole. The problem of the school as an ideal community is to find means for the realization of the possibilities of the children forming it.

"As all education is through self-activity, education, to be all-sided, must call into play all the activities of the being. Therefore the school must plan an environment for the child to which his whole nature will respond — mind, body, and soul.

"An ideal determines everything which goes into its realization. Our ideal of education must be one which calls out and develops all the activities of the being. The larger the demand it makes, the greater its reactionary or educative effect. If it calls the whole being into action, the whole being will grow through its action. It seems clear that the only ideal great enough in its demand to appeal to every power of the being is the *social ideal.*

"Social life, the life of the community, is the one thing great enough and complete enough to engage and set in motion every activity of which the human being is capable; therefore nothing less than the social ideal is sufficient for education.

"Essentials to carrying on community life are play and work. The individuals of the community enter into play from the necessity for exercise — physical, mental, and moral — and from the necessity for recreation. The community life calls for work to be done as the means of its being carried on. Individuals entering into the work of the community do so with intellectual and moral purpose as well as physical activity. In play and work both community and individuals are developed, since the good of one depends upon, and is identical with, the good of the other, the evolution of the individual and the evolution of the community being one.

"The questions for education then are: (1) What work does the community need? (2) What play does the individual need?

"The child is full of activities. It is his instinct to do things — to create. What work shall he do? Without doubt, under our ideal, he must do those things which his community needs to have done.

"Broadly stated, he is to enter into the struggle of the race and take his part in its work. This he must do with his own hands and through his own person. As he puts himself into the work of the world with all his senses stirring and capabilities aroused, he enters into the experiences of the race and begins his study of the problems which concern present living and have been a part of the past.

"In his work in wood he enters into the race-experience of building; through cooking, into the food activities of all people; his work in textiles carries him into man's problems of the necessities, comforts, and luxuries in clothing.

"As a child takes a part in any one of these fundamental occupations, the industrial relationships of that occupation make appeals to him on every hand. The clearness of his imagery in the subject makes all things pertaining to that subject clearer to his mind. He has made things and is interested in those things, in other people who have made similar things, and also in the processes of their work. So it is that through the work of his hands the child enters into life and gets an appreciation of its meaning.

PLACE OF HAND-WORK IN EDUCATION.

"Hand-work has a preëminent place in the new education, because (1) its product may be put to immediate use in the community life; (2) the processes involved are in themselves educative; (3) the materials, processes, and purposes involved in the work are wide in their relationships, and lead the worker out into larger intellectual and moral life.

"We will leave conscious work of philanthropy and reform to the older members of the community; let them take as serious view as possible of sociological conditions — and let the children make aprons and bags and doilies and cushion covers. They will joyfully work to fill a need that they can see and appreciate — which comes nearly enough within their own experience to make it seem real; and the joy they feel in making baskets for their mothers is really a part of the whole world-spirit of altruism or devotion to the good of all people. The love of making things will grow into a habit of directed social activity, if the child is encouraged to see and fill the simple needs of the people about him.

"Weaving has been a part of the work of man since the making of the first basket. The history of the development of the textile art would be the history of man himself, and such an account might be found in the printed volumes. But it is the doing of a thing which makes us understand and appreciate those who do or have done the same thing. A boy gets a clearer notion of the life of a weaver by weaving one rug than he can learn from reading the history of the textile industry.

"In picking the seeds from a cotton boll he gains a degree of respect for Eli Whitney and for his invention. An attempt to design one carpet or many carpets fills him with wonder at the culture and taste of the heathen to whom our country sends missionaries. By doing the things that are to be done, the child in school begins the study of the question of human labor and its rights. Through his own bodily sensations he gets some sense of the cost of labor. He learns to estimate the work of the world in terms of body and spirit. By translation of his own experience he gains the privilege of understanding in a degree the makers of our world.

"All this he gains through the activity of his own hand and brain working together. If we teach all our children in this convincing way, perhaps we shall be able to prevent another terrible revolution in which the people who work with their hands demand intelligent appreciation from those who use the product of that work. The

chipping of stone weapons, making of a bow and arrow, cooking over a fire struck out of flint, scraping and tanning of hides, building of huts, hunting for edible grains and fruits, the making of pots and baskets, smelting of metal, build into the child's life the material out of which history is made, so that his own experience teaches him something of the meaning of history.

"Interest in the thing he is making gives the child an interest in the way in which other people of the world are doing the same kind of thing. The desire to make his basket beautiful leads him to the delighted study of the basket of the Indians, Hawaiians, Javanese, and South Americans. Questions in the color arrangement of the rug he is weaving drives him with eager questions to the Orient, and the wonders of color combination which are as yet so far beyond him. Thus problems arising in his own work take him, with necessary vital inquiries, out to all people of all parts of the earth. And the answers to those inquiries explain to him the conditions of nature and civilization which surround the people whose work he is studying. It is in terms of climate, topography, soil, vegetation, situation, and transportation facilities that the information comes to him — geographical facts. The knowledge of geography gotten in this way gives to the child the true image of the earth as the scene and partial explanation of man's activities.

"But it is not to man only that the child puts his questions. Difficulties in spinning, in weaving, and in dyeing, in fact in all possible making, drive him straight to nature's laboratories. Science can solve many of his problems and teach him secrets for which his work waits. Appearing to him as a help in need, nature will become to the child that good mother she is so often called, and science will stand in his life as the giver of laws, under the operation of which he is able to shape the material of the world into the needs of man.

"Mathematical law is a necessary part of all science and construction — where they go, mathematics are needed. The making of things presents to the worker a series of mathematical problems, and these must be solved if his work is to be accomplished. How much more eagerly will the student attack those problems which come to him through work than he will those that come through the teacher and the text-book! When schools offer occupations which are part of the needed work of the world, our students will recognize the social value of the school, and will put into it their best efforts. Then school life will be as real as the life in the streets and on the farm, and our children will get as good training in applied mathematics and science as comes to our news carriers and country boys; but they will get it under the social ideal, not degraded by sordid motives of business life.

"This life of large activities in the school, the playing of games, working in shops and studios, the doing of things that need to be done, *the carrying on of the work*, will surely organize society, and, by employing all the energies of our boys and girls, it will make them joyfully creative and coöperative. Work done in this spirit is art. Morris says that 'art is the expression by man of his pleasure in labor.'

"He, again, in speaking of the beautiful things that fill the museums and are the delight of artists, asks: 'What are they, these wonderful things?' Just the ordinary utensils of daily life made by common people for the use of common people. They were made to fill human needs. They had nothing of that strained self-consciousness that vitiates so much of our own art production. The joy of the maker could not but express itself in forms of beauty.

"Compared with the art of the Renaissance, our art today is sick and puny. Art

has been isolated and carried too far from the life of the mass of people. It is a by-eddy in the stream of human progress. The great early master worked with a religious zeal and from religious motives. We shall have a great art when we live a great religion, a religion wide enough to embrace the most advanced thought of our time, and directed by moral purpose. This religion is the spirit of helpfulness, the desire to serve our day and generation in small things as well as in great. The children making the small things for daily use are working in this spirit and toward the religious ideal, and we may have faith that the outcome will be a genuine art.

"The comparative newness of hand-work in schools has made it thus far a subject rather 'tacked on' to the other subjects of the curriculum, as a luxury rather than a necessity in education. This idea of hand-work, however, will pass away, and it will be given its proper place in the course of study. As we come to realize the significance of our ideal of school as community life, we see the practice of hand-work as supplying the needs of the community. When we shall have found some of the most obvious needs of the community, we will set to work children and teacher to fill those needs. The manual training, cooking, and sewing will not be taught as valuable knowledge, but as social occupations. The school will have become a place of workshops, studios, gardens, kitchen laboratories, play-rooms, in which children will be compelled to give their best for the filling of human needs, where they will put themselves into the work of the world and feel themselves factors in it."

The last topic on Thursday morning was: "What Do the Exhibits Show? Their Strength; Their Weak Points." The first speaker, Miss Vandalaine Henkel, of St. Louis, praised the color work, and noted the improvement in the construction work. She thought the weaving delightful. As weak points she cited the crowding of the mounts in some of the exhibits and the lack of proper continuity. Most exhibits showed weak as well as strong links in the chain.

Professor F. F. Frederick, of the University of Illinois, who spoke on the same topic, deplored the fact that things were mounted so poorly in some of the exhibits; inaccurate cutting was evident; glue showed at the corners. He feared that there was too little mechanical drawing being done. He had observed also that no connection with the other branches of school work was evident in the exhibit; there was nothing but art work. He pointed out a lack of direction, particularly in the work of the sixth and seventh grades, and confessed that he was still clinging to the idea, old-fashioned perhaps in the estimation of some people, that pupils ought to be taught to draw something well. More rigid work would not harm some of the pupils whose work was shown. On the whole, however, he considered the exhibit most creditable, and a great improvement on the one made two years previous.

At the business meeting the following officers were elected for the ensuing year: president, Mrs. Jean McW. Miller, of Chicago; vice-president, Miss Abbie Dean, of Rock Island; secretary, Miss Adelia E. Denton, of St. Joseph, Mo.

The next annual meeting will be held in Minneapolis, Minn.

NORTHERN ILLINOIS TEACHERS' ASSOCIATION.

"The School and Society" was the general subject of the meeting of the Northern Illinois Teachers' Association held at Moline, Ill., April 25–27. As usual with this association, two of the papers were printed in full and distributed before the meeting.

These were both on "Sociological Teaching in Elementary Schools," the first on "The Essentials of Method," by Henry W. Thurston, of the Chicago Normal School, and the second entitled "Some Experiences," by Kate Starr Kellogg, principal of Lewis-Champlin School, Chicago.

Mr. Thurston began his paper by saying that in the past our feeling has been that American schools, of themselves, without making any special effort in the direction of sociological teaching, have in them such virtue, such an atmosphere of democracy and good citizenship, that every child who breathes this air must of necessity become a worthy member of society. Of late, however, some of us are beginning to fear that such optimism is not always justified by the facts. Too many exceptions are constantly forced upon our attention. It is now urged that good citizenship in our many-sided democracy is not easy, but difficult, and requires special preparation.

"Progressively better membership in society must be our aim.

"Society is made up of societies; therefore, better membership in society must be attained through better membership in societies.

"Society is general, vague, complex, intangible; societies are specific, definite, comparatively simple, and concrete. A society is a group of people organized to do something — a group of people in harmonious action. For example: a family, a baseball team, the pupils and teacher of a room, a literary club, an orchestra, a chorus, a business corporation, a labor union, a church, a town, the city, the state, the nation, and the industrial system as a whole are at their best societies, each with a special membership and each having special functions or things to do.

"From this point of view it is clear that each pupil in an elementary school is already a member of several societies. But his consciousness of membership in some is much more vivid than it is in the case of others. At least three groups of societies may be made, based upon the pupils' different degrees of consciousness of them:

"1. Those of which he is least conscious. For example: the town, city, state, nation, and industrial society as a whole.

"2. Those of which he is partially conscious, but whose deepest meaning he has only begun to understand. For example: the family and the school.

"3. Those of which he is most fully conscious, those which he enters only as a result of his own conscious purpose. For example: groups of playmates, social, literary, and athletic clubs.

"But it is only upon this basis of a person's consciousness of membership in a particular society that he can be an ideal member of it.

"In each society of each group just mentioned the individual is an ideal member only to the degree that he is habitually sensitive to the actual and ideal functions of the society, sympathetically conscious of his unity with the other members, and voluntarily at work with them to the end that the society may perform its ideal functions.

"Stated specifically, then, the aim of sociological training in the elementary school is to help the pupil to grow into conscious coöperation, not with society in general, but with those particular moral societies of which he is a member and whose functions touch his life at the most points."

Mr. Thurston believes that the formal study of "civics" during a few months of the last year or two of the elementary-school course will prove inadequate to meet the needs. Much of the material with which to do the right kind of sociological work is already available in our best schools, especially in connection with the life of the school.

"Much of the material for doing what has been suggested is already available in our best schools, especially in connection with the life of the school, the form of the school organization, political, commercial, and industrial geography, arithmetic, and history. In most cases, however, this material can be used in such a way as to get out of it much more of sociological meaning. It should not be used as isolated, formal, objective material, but in connection with the various human needs and organizations which produce it. It needs social interpretations."

Miss Kellogg's paper told of the practical work in "municipal civics" done last year in the Lewis-Champlin School. Beginning with the fire department in the primary grades, this work covered many such subjects as the "smoke nuisance," disposition of garbage and sewage, the drainage canal, and regulations concerning the planting and preservation of trees. All this was done, not through lectures by the teachers, but by personal investigation and study on the part of the pupils themselves. They visited the engine house, they consulted the fire marshal's report, they went to the Field Museum to study the history of fire extinguishers. They visited the third ward dumps, kodak in hand; the Bridewell crematory and the Turner reduction plant were seen by the seventh-grade pupils while they were studying the disposition of garbage. This work did not stop with Chicago; Colonel Waring's work in New York city, for instance, was a subject of special study.

The discussion of these two papers was opened by Mr. H. A. Weston, of the University of Illinois, who viewed the question from the standpoint of a university expert. He believed that sociological training would amount to but little until handbooks or text-books were supplied. The teacher cannot be expected to get together her own material. District Superintendent Lincoln P. Goodhue, of Chicago, on the contrary, who followed in the discussion, emphasized the statement that the pupils should get the information needed; the teacher should be cautioned not to get it for them. He would have no text-books except for reference. Miss Zonia Baber, of Chicago Institute, believed that the sociological instruction should be based upon social activities. "The activities of the world should be the basis of study and not added to it. Sewing, weaving, cooking, clay modeling, have been introduced as 'extras,' not as vital elements in the course of study. Suppose we make the activities the center; then we shall not have need for all the subjects, yet we shall gain sufficient skill. The country boy saws and planes and gets skill of necessity. There is a world-wide difference between the country boy's chicken-coop and a sloyd model. The child does not have to be urged to sail his boat, to make a kite, but in school we assign lessons."

At the Aurora meeting in April, 1900, a special committee on bibliography of manual training was appointed. Their report was appended to the program of the Moline meeting. It was as follows:

BIBLIOGRAPHY OF MANUAL TRAINING.

MR. PRESIDENT:

Your committee have come to appreciate the extreme difficulty of the task set for them, namely: to prepare a list of books on manual training, such as are needed by the regular teachers of the elementary schools. Although manual training is rapidly taking its place in the elementary schools, there are yet very few books on the subject intended to supply the needs of such teachers, and of these fewer are worthy of a place on a list published by this association. It is possible to find much better work being done in schools than can be found described in books. Your committee have

therefore reached the conclusion that they can best serve the association by listing a few manuals, each with an explanatory note which will serve as a guide to intending purchasers. We regret that on several important lines of manual-training work we are unable to recommend any books which are worth buying.

As a suggestive outline of work for the several grades we recommend the November, 1900, number of the *Teachers College Record*, published by the Columbia University Press, New York. The price of this manual-training number is 20 cents.

With these explanations we submit the following list:

Cane Basket Work, by Annie Firth. London: L. Upcott Gill. Price, 1s. 8d. This is a well-illustrated book explaining the elementary processes of basket-making.

Cardboard Construction, by J. H. Trybom. Boston: Rockwell & Churchill Press. Price, $1. A two-years' course fully illustrated, with working drawings and sketches. It gives information concerning tools and materials, also working directions for each model.

Manual of Cardboard Modelling, by W. Heaton. London: O. Newman & Co. Price, 5s. 6d. The drawing and instructions are clearly arranged, so that a student has everything necessary before him without cross-references.

Clay Modeling for Schools, by George S. Haycock. London: O. Newman & Co. Price, 2s. This is an extremely useful book. It gives a great amount of practical information, and has an appendix "On Teaching the Elements of Geography by Modeling in Clay and Soft Sand."

Household Sewing with Home Dressmaking, by Bertha Banner. New York: Longmans, Green & Co. Price, 90 cents. A helpful illustrated manual.

Teachers' Handbook of Sloyd, by Otto Salomon. London: George Philip & Son. Price, 5s. 6d. This is a thoroughly reliable and practical book.

Bench Work in Wood, by W. F. M. Goss. Boston: Ginn & Co. Price, 70 cents. Part I of this book is a valuable treatise on bench tools. Part II, on bench-work, contains some good suggestions concerning the use of tools, but the course of instruction outlined is of no value for grammar schools.

CHAS. A. BENNETT, *Chairman*.
H. D. THOMPSON.
ROBERT M. SMITH.

QUERIES.

2. How much latitude in the choice of models should be left to the teacher? and how much can be safely intrusted to the pupil's own initiative?

5. (*a*) Ought I to recommend the use of a desk-cover or some similar schoolroom device in our grammar grades? (*b*) If so, what form of desk-cover is most satisfactory? (*c*) What tools should accompany it, and what will such an outfit cost?

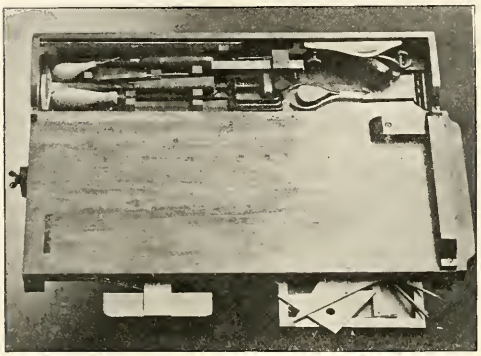
REPLIES.

5. (*a*) In the hands of a resourceful manual-training teacher a well-equipped desk-top is a very valuable device, and yet, for the grammar grades, we ought not to recommend a desk-top or any other similar device as a substitute for a bench, except for such schools as have not the room for benches, or schools that cannot afford the usual bench outfit. The bench-work, in these upper grades, is too valuable a factor in

the mental and physical development of our school children to be set aside for any form of a makeshift.

(*b*) However, for such schools as cannot have benches there is nothing better than a compact desk-top. It should be attractive, easily fastened to the desk, and of such a size that each pupil may be able to adjust and fasten it to his desk and return it to its case when through work.

The accompanying engraving represents "The Rochester Desk-Top," which was designed for use in the grammar grades of such schools as cannot afford the regular bench equipment. This desk-top is constructed so as to cover the entire top of an ordinary schoolroom desk, about sixteen inches wide by twenty-four inches long. At the back is a recess which is provided with blocks and cleats of various shapes to hold the tools in place. At the right and beneath the top is a drawer for drawing instruments, sandpaper, and sandpaper block. A T-square is held in place by means of two rabbeted cleats on the underside of the top. At the left-hand end is a hardwood "bench stop," which, when not in use, can be dropped flush with the surface, and the desk-top can then be used as a drawing board.



THE ROCHESTER DESK-TOP.
(Patented.)

At the right hand is a shooting-board which is fitted with a guide that prevents the plane from tipping and bruising the stop.

The top is secured to a desk by means of a special clamp, which is simple and strong and of such a form that the desk-top can be fastened to a cleated board or an ordinary table.

The desk-top is constructed of white pine; the shooting-board, stop, and clamp are made of cherry.

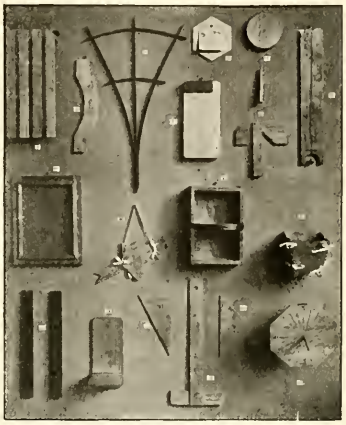
For sawing, in a large class, it would be necessary to provide a small table equipped with about six back saws and an equal number of bench-hooks and three or four saw-boxes.

(*c*) The tool equipment consists of the following: a measuring rule, try-square, block plane, chisel, knife with two blades, marking gauge (small), hammer, brad-awl, six-inch file, gimlet, and a small iron clamp. Besides the above woodworking tools there is the drawing outfit, which consists of two triangles, a T-square, compasses, and thumb tacks.

A single desk-top will cost about $3; one set of tools, about $3. In lots of a dozen or more the cost would be less.— W. W. MURRAY.

5. A letter has come from Mr. Frank M. Leavitt, supervisor of manual training in Boston, from which we have obtained permission to quote. Mr. Leavitt says he has

had but little experience with desk-covers, but the little he has had has led him to feel that "even a crudely equipped basement room is better than an attempt to convert a schoolroom into a woodworking laboratory." "Such a scheme always contemplates the employment of the regular teacher as the instructor, which, some day perhaps, will be ideal; but even then it would seem much better to move a class from one room to another than to move in an equipment, light and consequently incomplete as it must be." "I am inclined to think," says Mr. Leavitt, "that if manual training is really desired in a community, some way will be found to simply equip some special room for the work. I refer, of course, only to woodwork. For cardboard-work little is needed beyond scissors, knives, simple boards, 14×10 inches, and drawing instruments."



THE ABOVE MODELS WERE MADE ON A ROCHESTER DESK-TOP.

The above answers and the ones published in the January issue suggest additional questions. Perhaps it may be taken for granted that a very large majority of the teachers of manual training would recommend that an extra room be equipped with suitable benches and tools for classes from the two upper grammar grades — the seventh and eighth. If an extra room were available — even if it were in a poorly lighted basement, and the appropriation for its equipment were inadequate—Mr. Leavitt would evidently take it in preference to desk-tops in the regular schoolroom. Probably Mr. Murray and Mr. Kendall would prefer the desk-tops. If such a room were not available, what should be done? Would you use desk-tops or would you delay the introduction of manual-training work, turning agitator in the meantime? Or would you introduce some simpler form of hand-work into these grades — a form requiring the use of only such tools as the knife, scissors, and pliers, hoping to secure the extra room well equipped in the future?

But the desk-cover question has another phase. Shall desk-covers be used in grades below the seventh? If you were provided with an extra room for your seventh- and eighth-grade pupils, would you recommend a desk-cover outfit for the fifth and sixth? If you could not have another extra room for the pupils of these grades, would you try to find a time when you could take them to the room equipped for the pupils of the seventh and eighth grades? Or would desk-cover outfits be better? Or would the work you would recommend be so simple in character that no desk-cover would be needed, or none other than a piece of marble-cloth or strawboard to prevent scratches on the desk? Perhaps you would choose the latter plan with the addition of a single bench or table in the schoolroom, where one or two pupils could work at a time with tools to supplement those used at the desks. Possibly you are thinking of placing a drop-shelf around the schoolroom under the blackboards which may serve as a long bench for manual-training work. Or it may be you have concluded to go back to

first principles and design new schoolroom furniture which will more fully meet the demands of the present day.

If you are a teacher of manual training in elementary-school work, you must have considered some of these questions. You are invited to contribute to this column the results of your thought and experience.— EDITOR.

BREVITIES.

TACOMA, Wash., is working to get the National Educational Association convention of 1902. St. Louis hopes to get it in 1903.

MASSACHUSETTS.

MISS VIRGINIA I. LYONS, formerly of Newton, is now instructor in manual training at the E Street Manual Training School, South Boston.

BROOKLINE has voted $100,000 for a new manual-training high school, and ground is to be broken at once. It is to front the Cypress street playground, adjoining the English High School and the public bath-house.

THE normal department of the Sloyd Training School gave its annual exhibition May 24 and 25. As usual, the original work was rich and suggestive. The decided novelties were the models offered by the Cuban students, being working models of appliances used locally in Cuba.—JOHN C. BRODHEAD.

THE annex to the Lowell, Mass., high school contains a room 29 × 63 feet for forging, another for turning, a third for joinery, and a fourth for machine-tool work. A drawing room 24 × 50 feet is in the main building.

THE semi-annual meeting of the New England Association of Teachers of Metalwork was held at New Bedford April 6. The two papers on the program were "Forge-Shop Equipment," by Edward P. Hutchinson, and "Our Product — the Boy," by F. H. Cranston.

DR. EUGENE BOUTON, superintendent of schools in Pittsfield, Mass., has recommended that manual training and domestic science be introduced into the eighth-grade schools in his city.

CONNECTICUT.

PROFESSOR EDGAR MARBURG, of the University of Pennsylvania, gave an address before the Hillyer Institute, Hartford, on April 24, which called forth much favorable comment. His subject was "The Need of Industrial Education."

THE town of Talland is to have an educational institution of the modern type. Mr. Ratcliffe Hicks, a native of the town, proposes to establish a school for youth of both sexes and endow it with from $100,000 to $1,000,000. The object of the school is reported to be "to give free education of a practical sort in various trades and occupations." In this connection engineering, surveying, architecture, bookkeeping, and typewriting are mentioned.

NEW YORK CITY.

A MEETING for the benefit of the Tuskegee Normal and Industrial Institute was held on March 18 at the Madison Square Garden Concert Hall. Addresses were

given by Morris K. Jesup, chairman of the meeting; Bishop Potter, Booker T. Washington, William H. Baldwin, and others. Paul Lawrence Dunbar, the negro poet, read selections from his own works.

Mr. Jesup dwelt upon the duty and the necessity of fitting the 10,000,000 negroes of the South for participation in the rights and duties of citizenship.

Mr. Baldwin spoke of the grand work which was being done to this end at Tuskegee, and concluded by appealing for funds to carry it on. It was announced that $10,000 had been promised on condition that $25,000 more could be obtained within thirty days.

Mr. Washington, who was received with great applause, gave some account of the work of the institute and its needs. He appealed for justice to the negroes, who, he said, were capable of intellectual and moral progress, and should be judged, not by the worst of their race, but rather by the best.

The concluding address was given by Bishop Potter, who spoke in high terms of the character and ability of Booker T. Washington, and urged those present to render substantial aid to the work of the institute.

The interest of the public in this movement was manifested by the numbers who sought admission to the meeting. The hall was crowded to its utmost capacity, and hundreds were turned away disappointed.

TEACHERS COLLEGE has received a gift of $100,000 for the erection and equipment of a new building for the Experimental School. The donor's name has not been made public.

This school, which is used in connection with the observation and practice work of the college, has been in operation for some three years in an old building in a poor district a short distance from the college. It consists of a kindergarten and elementary school, with special classes in cooking, sewing, and manual training, the children in attendance being from homes in the vicinity of the school. Tuition is free.

Competitive designs for the building have been submitted. The one which it is thought will be accepted shows a frontage of fifty feet with a height of five stories above the basement, the depth being seventy feet, with a basement extension of thirty feet.

Negotiations are in progress for the purchase of a site, which it is expected will be on Lawrence street, not far from the location of the present building. The new school will afford special advantages for the study of manual training in a very practical way.

THE manual-training work of the schools of Trinity parish of this city was exhibited at Trinity Chapel School on May 9, 10, and 11. Excellent work was shown in all departments.

AN exhibition of the hand-work of the Horace Mann School, College, and Experimental School was held at Teachers College May 31, and June 1 and 3. College students' work in each of the departments of fine arts, domestic art, domestic science, and manual training was displayed in the respective laboratories of those departments, the exhibit of the Horace Mann School being attractively arranged in the spacious kindergarten room and that of the Experimental School in a room adjoining.

To attempt a description of such a varied and comprehensive collection would be out of the question in the brief space to which this notice must be confined, but it

may be said that the endeavor to give the widest possible scope to self-expression in the individual was evidently the predominating motive of the whole. The fact that the scope of self-expression must be limited by the school conditions as well as by a due regard for the greatest good of the worker is fully realized. This is clearly set forth by Professor Richards in a late number of the *Teachers College Record*, where he says: "It is true . . . . that the opportunities of introducing such work under ordinary school conditions in a thoroughly natural manner above all but the lowest grades seem very limited;" and again: "The problem presented is essentially one of proportion and balance between freedom of expression on the one side, and skill or mastery of processes on the other. Extreme emphasis on the one side leads inevitably to a chaos of crude and ill-considered products, while attention restricted to the other results in mere drill and formalism."

THE public schools of Manhattan and the Bronx are making a very satisfactory showing in the line of drawing and constructive work for the term about to close. Much has been said about the practical difficulty of developing originality of thought and expression under the conditions which prevail in most city schools, and this difficulty certainly exists in New York, yet that much may be done with the right spirit on the part of the teacher and the right hand at the helm has been clearly demonstrated.

In the scheme devised by the supervisor, Dr. James P. Haney, for the grammar schools provision is made in every grade for original work on the part of the pupil. In the first three grades, 4A to 5A inclusive (fourth year and first half of fifth), all constructive work is in paper. A class model is drawn, cut out, and pasted, after which a type model of similar form is presented and modifications of the design called for. The results obtained in general are such as will gratify the optimist and surprise the skeptic. This alternation of class model and individual effort continues throughout these grades, all instruction being given by the grade teacher.

In the last half of the fifth year (Grade 5 B) knife-work is taken up. In this and all succeeding grades the drawing is taught by the regular teacher and the tool-work by the shop instructor. The original design now, instead of following each regular model, comes only at the end of the term after a series of class models has been made, being worked out from drawings made under the class teacher. This plan holds throughout the remaining grades, covering the sixth and seventh years. In Grade A 6, the first in which bench-work is taught, the supplementary model is a bracket shelf, which, though designed and executed with all degrees of taste and skill, generally calls forth that eager interest in his work which leaves the boy better for having done it. No type model is given for the supplementary work in Grade 7 B (last half-year), each pupil being expected to make his own selection, and being obliged to depend largely on his own resources in carrying out his project. Much excellent work, however, is turned out.

An exhibition of work from the schools of the borough is in preparation.

MEETINGS of the Manual Training Teachers' Association are held monthly at Public School No. 30. Methods of teaching the course of work now in use in the borough have been under discussion for the past three months. The constitution and by-laws of the association, very neatly printed, have recently been issued.

THE ETHICAL CULTURE SCHOOLS, 109 West Fifty-fourth street, were visited recently by the shop-work instructors of Manhattan and the Bronx, accompanied by

the supervisor, Dr. Haney. Exhibits of the work of all grades, from the kindergarten to the highest grammar grade, were arranged in the class-rooms. These were made especially interesting to the visitors by the courtesy of Mr. Frank A. Manny, principal of the school, who explained the relation of the hand-work to the work of other departments and called attention to many points worthy of special notice. A noteworthy departure in kindergarten work was the small work-bench supplied with saw, chisel, hammer, and cross-handled bit. Each bench accommodates four children. It is held that the use of these "all-hand" tools is better for children of tender years than those occupations which call for greater concentration and the use of the finer muscles.

The last room visited, and that no doubt the chief center of interest to the party, was the workshop, where the work of the several grades was exhibited and the underlying motives explained by the instructor in charge, Mr. Arthur W. Richards. Since we are promised a review of this course of work by Mr. Richards in the MANUAL TRAINING MAGAZINE, nothing further need be said of it here. Having appropriately expressed their thanks to the officers of the Ethical Culture Schools for the courtesy extended to them, the guests departed, well pleased with their visit.

A NEW building for the Ethical Culture Schools is soon to be erected on Central Park, West, having a frontage of a whole block between Sixty-third and Sixty-fourth streets. The plan and equipment of the school will be thoroughly up to date, ample room being provided for workshops, gymnasium, library, and assembly hall, besides all the necessary class-rooms and laboratories. Considering that the Ethical Culture Schools have been among the pioneers in educational manual training, this mark of progress cannot fail to be of interest to all friends of the cause. — W. F. VROOM.

DR. M. P. E. GROSZMANN has moved his school from Comenius Grove, Vareo, Va., to "The Pinehurst," a fine old mansion located at the corner of Fort Washington avenue and Depot Lane, New York city. This school has been established by Dr. Groszmannn "for the benefit of a small number of children whose individual needs require physical, mental, and moral treatment by experts." "The work includes school gardening, manual training, art instruction, outdoor sports, gymnastics, and as much of the usual studies as the pupil is able to master in an intelligent manner."

CALIFORNIA.

A MEETING of the Pacific Manual Training Teachers' Association was held on Saturday, June 1, at the Sixth Street School, Los Angeles. Miss F. F. Sterrett, of Throop Polytechnic Institute, read a paper on the "Plastic Art," giving some valuable points drawn from her experience in this country and Europe. Miss Florence A. Stevenson, supervisor of domestic science in Los Angeles, presented some problems in cookery, and Mrs. Grace E. Dutton, of Throop Polytechnic Institute, spoke on the "Influence of Dress upon Character." The discussions were free and valuable.

Already the association has secured a number of texts, bearing upon the various lines of manual training, to be used in its circulating library.

THE Redlands school district, Principal Fred A. Wagner, has done some good work this year in paper and cardboard and at the bench. A supervisor will likely be engaged for next year.

AT Santa Barbara Miss Edna A. Rich, principal of the manual-training school, has been pushing forward. There is no school in the country where more thoughtful,

thoroughgoing work, along elementary lines, is done. Investigation shows that a large number of former students of the department have passed through the high school and are now in the university, or are filling positions of honor and trust. A public exhibit of work of the school was held recently, and was received with much favorable comment.

FOR the first time since drawing was placed upon the list of accredited subjects by the state university, the Monrovia schools, Principal T. H. Kirk, have received recognition in this subject. Miss Yetta F. Dexter has charge of the drawing department.

CHARLES A. MILLER, Los Angeles Normal School; A. L. Olson, San Diego; and C. A. Kunou, Los Angeles, report a healthy progress in the work. Miss Ella V. Dobbs, supervisor of cardboard construction, Los Angeles, has made a thorough success during this, the initial year of the subject there. The drawing is much improved, and grade teachers generally are recognizing the value of the paper materials.

THE annual exhibit of work at Throop Polytechnic Institute was held day and evening of June 14. Mr. F. H. Ball, director of manual training, was in charge.

Miss F. F. Sterrett has been made director of the art department, and Mrs. Grace E. Dutton, director of the department of domestic economy. The normal departments in art, manual training, and domestic economy have been brought together, and Mr. A. H. Chamberlain will be principal.

In addition to the work listed in the announcement of the summer school, courses in cooking and sewing will be offered by Mrs. Grace E. Dutton.—ARTHUR H. CHAMBERLAIN.

PHILIPPINE ISLANDS.

A CIRCULAR letter received from Dr. Fred W. Atkinson, general superintendent of public instruction in the Philippine Islands, contains the following statement of qualifications required of teachers going from the United States to the Philippines to take positions in schools established by our government:

"1. Applicants must be either normal or college graduates.

"2. They must have had several years' successful experience in school work and be now engaged in teaching.

"3. Copies of testimonials and a late photograph should accompany each application.

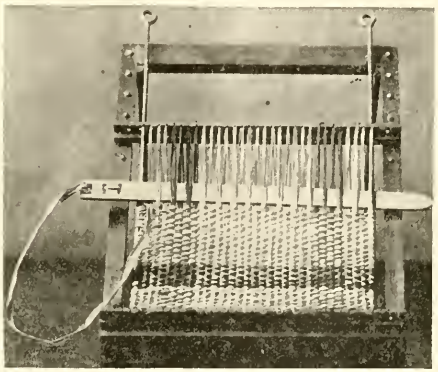
"4. They must be physically sound and able to withstand a tropical climate, and willing to accept whatever location may be assigned them by the general superintendent of education."

Most of the teachers wanted are for primary-school work. A majority of them will be paid $75 gold per month the year round.

The act establishing a department of public instruction in the Philippine Islands contains a section authorizing the establishment of a trade school in Manila "for the instruction of natives of the islands in the useful trades." A school of agriculture is to be established in the island of Negros and a normal school in the city of Manila. The sum of $25,000 has been authorized for the purpose of organizing and maintaining the normal school for the year 1901, $15,000 for the trade school, and a like sum for the school of agriculture. Buildings in Manila for the trade and normal schools, including equipment, are to cost not more than $400,000.

A HAND-LOOM.

THE simple and convenient adjustable hand-loom shown in the accompanying engraving was invented by Mrs. M. P. Todd, a teacher in one of the Minneapolis public schools. It is 9×12 inches and has been designed especially for school use. It seems to have appeared at just the right time, when so many teachers desire to introduce weaving. It is suited to a great variety of work and is spoken of in high terms by those who have used it. Mrs. Todd has applied for a patent and is just placing the loom on the market.



ILLINOIS.

OAK PARK is to start work in domestic science next year; also Evanston.

THE opening of new rooms for the study of domestic science at the University of Illinois was the occasion of a large gathering which had come to listen to an address by Miss Alice Ravenhill, of England. Miss Ravenhill is inspector of hygiene and domestic economy under the technical instruction committee of the County Council of the West Riding of Yorkshire, who has come to the United States appointed by the Board of Education for England and Wales as a special commissioner to study the present position of domestic science and hygiene in the curricula of schools and colleges for both sexes, and of various grades and types, in the United States. After the public exercises a reception was given in Miss Ravenhill's honor. Among the receiving party at this reception were Mrs. Nellie S. Kedzie, of Bradley Polytechnic Institute; Mrs. Alice P. Norton, of Chicago Institute; Miss Caroline L. Hunt, of Lewis Institute; and Miss Isabel Bevier, of the University of Illinois. On the following morning a conference was held to discuss the needs of the schools in Illinois with reference to the teaching of domestic science.

DURING the past winter and spring Mrs. Nellie S. Kedzie, head of the department of domestic economy of Bradley Polytechnic Institute, has been in constant demand for lectures and institute work. This work, in which Mrs. Kedzie has been so successful, has often taken her beyond the borders of her own state. An increasingly popular course of ten lectures was given by her at Purdue University. At the biennial meeting of the Federation of Women's Clubs of Iowa, held at Council Bluffs, she spoke on her favorite theme; also at a meeting of the Woman's Auxiliary of the Manufacturers' Association of Kansas City. This organization is working for better food supplies and for the establishment of a school of domestic science to teach young housekeepers more about foods. While in Kansas City she spoke to the 1,400 pupils of the Manual Training High School gathered in their great assembly hall. One of Mrs. Kedzie's most recent audiences was that of the Illinois Congress of Mothers in

the State Normal School building at Charleston, Ill. Such work is bearing fruit in a wider interest in the subject of domestic economy and an increasing demand for its introduction into public schools.

CHICAGO.

AT last the English High and Manual Training School has a new building promised. A site has been selected on Van Buren street, between Oakley and Irving avenues, and as soon as the condemnation proceedings are completed building operations will begin. It is promised by the members of the board of education that it will be the best building of its kind in the country. The sum of $300,000 has been set aside for this purpose.

AN extension of high-school manual training has been decided upon at an early date. The old Lyman Trumbull School building has been set aside as a manual-training high school for the North Side, and it is expected that it will be ready to receive students at the opening of school in September. It is to be hoped that this will to some extent relieve the present congested condition of the English High and Manual Training School.

MR. SMITH, the supervisor of manual training, has been placed in charge of the domestic-science departments of the elementary schools.

THE new requirements for teachers of manual training have just come to hand. The following copy will be of interest, showing that it is the intention of those in authority to place manual training on the same pedagogical basis as the other studies:

"I. *Requirements for admission to examination.*—Candidates must be at least twenty-two years of age, and will be required to pass a physical examination before a certificate is awarded.

"Official credentials must be filed with the superintendent of schools, showing that the candidate has had:

"(1) A training equivalent to the course required for graduation from the Chicago Normal School, or

"(2) Four years' successful experience in teaching, or is

"(3) A college graduate with one year of experience in pedagogical training.

"II. *The examination.*—The candidate is required to take an examination in the following subjects, the standard for passing being a general average of 75 per cent.:

"(1) *Mathematics.*—Arithmetic, algebra, including quadratics, and plane geometry.

"(2) *Drawing.*—Free-hand and mechanical drawing, including perspective, geometrical drawing, and the elements of design. (Applicants are requested to bring T-square, triangle, drawing board, and drawing tools.)

"(3) *Physical science.*—Elements of physics and chemistry.

"(4) *Theory and practice.*—Principles and methods in constructive and manual-training education.

"(5) *Shop technique.*—Woodwork.

A FOUR-YEARS' course for the manual-training high schools is now being prepared, and it is hoped that it will go into operation in September. While this is a four-years' course, manual training is made compulsory only three years. The fourth year is left to a considerable extent elective, as it is presumed that students who have had three years in high school begin to have some thoughts about what they desire to do after completing their high-school course and will make their elections looking to that future.

O. McMURRY, who for the past year has been studying in Columbia University, has been appointed to take the position of teacher of the pedagogics of manual training in the Chicago City Normal School. Thus manual training is gradually taking its seat along with the "ologies" and "osophies."

A SHORT time ago I had a visitor in the person of a university professor who has charge of the preparatory academy of a large university, who was looking for information with a view to placing a manual-training outfit in said academy. He had concluded that there were other things besides the classics that might interest boys and thus keep them under the influence of the school longer.— A. R. ROBINSON.

ARMOUR INSTITUTE has been enriched by a $1,000,000 gift from Mr. J. Ogden Armour and his mother, Mrs. P. D. Armour. This makes the total resources of the institute about $5,000,000 and enables the trustees to progress in their plans for making it one of the best-equipped engineering schools in the country. The gift is particularly significant because it indicates that the family will continue to watch over and provide for the school so well founded by the late Phillip D. Armour. Mr. J. Ogden Amour is quoted as saying: "We regard the institute as something which we, as a family, shall continue to assist whenever it needs it. Its work is not all matured by any means. As more demands are made upon it and as new methods of mechanical work are developed, more money is needed in the school, and from time to time we shall see that the work is not being neglected."

Since the above gift was made public, it has been announced that Mrs. P. D. Armour has agreed to give an additional $50,000 and a piece of land for a new building to be used for shops. The building will probably be two stories high on a lot 135× 98 feet. It will contain shops for forging, foundry, machine-tool work, pattern-making, and general woodworking. Work on the construction will be commenced at once, so as to have the building ready for occupancy by next September.

Two other important announcements have been made at Armour Institute during the past few weeks. Hereafter it is not to be coeducational; girls are to be excluded in the future, but they will be cared for under the same teachers in a new school of domestic science and art which secures its equipment through a gift of Mrs. P. D. Armour. The new school will be under the patronage of the women's clubs of Chicago. The other important announcement is that Dr. Gunsaulus has been recalled to the presidency of Armour Institute. It seems evident that the Armour family has not at any time been willing to give him up entirely to Central Church.

THE new University of Chicago School of Education mentioned in our last issue is to occupy a half-block of land bounded by the Midway, Monroe and Kimbark avenues. Here will be erected a group of buildings to accommodate the elementary school, under Colonel Parker, and the secondary school, under Dr. Dewey. This group will be called Scammon Court in honor of J. Young Scammon, a former friend and patron of the old Chicago University. This is in consideration of the fact that Mrs. Scammon sold the land upon which they will stand to the university at half its estimated value.

THE GROWING INTEREST IN MANUAL TRAINING AND DOMESTIC SCIENCE.

WHETHER these subjects of study have their place in cities of from ten to thirty thousand inhabitants is steadily being answered in the affirmative. During the week of May 1 the writer lectured on these subjects in the cities of La Crosse and Beloit, Wis.; also in Menominee and Howell, Mich. In La Crosse Superintendent John P.

Bird has a warm professional interest in these occupation studies, and in planning for a new high-school building expects to have a woodworking laboratory and rooms arranged for the study of household arts; possibly the seventh and eighth grades of a part or the whole of the city of La Crosse may enjoy these privileges. The representative business-men, members of the board of education, and prominent members of the woman's club expressed an appreciation of the educational advantages of the manual studies, which augurs well for the success of Superintendent Bird's plans. At present no form of cooking, sewing, or manual training is found in the La Crosse schools.

The city of Beloit is as fortunate in its educational facilities, from kindergarten to college, as it is in the high intellectual character of its population. Superintendent F. E. Converse has developed a splendid intellectual system, and now he is anxious to add manual training. Under the shadow of Beloit College, that most classic of western institutions, the spirit of manual training will doubtless take root. The student body of the Beloit high school coöperated with Superintendent Converse in providing for the lecture and arousing a general interest among the citizens of Beloit in the subject. They hope to avail themselves of unoccupied space in their commodious high-school building. The scientific value of the occupation arts of the schoolroom is sometimes not as readily recognized as the utilitarian, but in intellectual cities, of which Beloit is a type, it must furnish the basis of any scheme of propaganda. The city of Menomonie, Wis., has set the pace for a system of industrial manual-art education, and the result of Senator Stout's beneficence is felt in many interior western cities.

Superintendent O. I. Woodley, of Menominee, Mich., has educated the school authorities and citizens of Menominee to the appreciation of an all-round balanced system of education. He has taken the interesting way of making his own manual-training benches and various items of equipment. Sunny rooms in the high school are equipped with woodworking benches, lathes, saw, and grindstone. His drawing stands are of home plan. He hopes to incorporate domestic science, thus paralleling the work for boys with occupation study for girls.

The village of Howell, Mich., population about 3,000, may be one of the first small interior towns of the middle West to take up the special studies for training hand and eye. Five hundred people attended the lecture there and gave evidence of great interest in the work. The population is of the retired farmer class, such as is common in the towns of that size. Taxation will be far more burdensome in a community of this size than in places of great vested interests. It will be plucky and evidence of great faith in the advanced trend of educational thought for the people of Howell to introduce manual training and domestic science, but they promise to do it.—H. T. TIBBITS.

EDITORIAL.

We have been reading Gilbert B. Morrison's monograph on "School Architecture and Hygiene,"[1] and it has suggested a question of curriculum. This excellent monograph deals with the various types of school buildings from the one-room country schoolhouse to the large public-school buildings of our leading cities. The chapter on high-school buildings especially attracted our attention. Mr. Morrison has developed this part of his subject by selecting a few typical buildings, showing their plans and elevations, when possible, and adding enough figures to make the whole admirably specific. The first of these typical buildings is the Latin and English high school of Boston. In describing this the assembly-hall and the theater type of lecture-room for science teaching are emphasized. The second building is the Cambridge English high school. This represents the "physical-science stage in high-school development," the biological sciences being still "in the show-cabinet stage, no provision being made for working laboratories." Drawing is given a place in the building. The third building is the Springfield (Mass.) high school. Its many excellencies are noted. Especially does the author point out that in this building we find the full development of the science work, there being laboratories for the physical, the biological, and the earth sciences; also an astronomical observatory. Drawing is given more space here, and a lunchroom and other valuable features are added. Following this, Mr. Morrison speaks of the rise of manual-training schools and their growth and development, and then adds: "Thus have the two types of school — the purely academic and the purely mechanical — grown, developed, and converged into one correlated unit forming the high school *par excellence*" — the manual-training high school. His fourth typical building is his own — the Kansas City manual-training high school. This contains the essential features of all the other types, and in addition a joinery shop, pattern shop, machine shop, molding room, forge shop, a room for domestic science, and another for domestic art. These are conveniently located with

[1] *Monograph No. 9* in series on "Education in the United States," edited by Nicholas Murray Butler, published by J. B. Lyon & Co., Albany, N. Y.

reference to other rooms. In fact, the entire building is a unit in plan and well deserves the reputation it bears of being the finest manual-training high-school building in the United States, which means in the world.

But there is one vital question which comes to mind in this connection, and it is suggested by Mr. Morrison's expression, "the high school *par excellence*." Of course, Mr. Morrison is speaking of the present time; it is our privilege to consider the future also. The question is this: Will the manual-training high school of today be "the high school *par excellence*" ten years or twenty years hence? Or, changing the question a little, will the manual-training high school have to be modified to produce the future high school *par excellence?*

In answering this question one recalls the fact that at the present time great emphasis is being placed upon the manual-training work of the elementary school. Unless signs fail, manual training will find its chief place in the elementary school. This means that the manual-training work in the upper high-school grades will have to be greatly broadened, or it will become more and more technical in character. In any case the argument for its introduction and maintenance in these upper high-school grades will be in danger of being weakened.

Looking at the problem from another point of view, manual training is not yet in a majority of the high schools, so that practically the question in a very large majority of cases will be, How much are we justified in providing for in the high school? and not, Can we afford to dispense with a part of the manual training in our high school, owing to the fact that manual training is now in our elementary school?

Moreover, at the present time the public manual-training high school is nearly always in the same city with a public general high school in which no manual training is offered. In a few cities there are three or four special high schools, besides the manual-training high school. Even if it were granted that several such specialized high schools constitute an ideal scheme of secondary education for a large city (which, in their present form at least, is certainly open to question), considerations of cost and economy of operation place such a scheme beyond the means of cities of even considerable size, and debar it entirely from smaller cities and towns. The practice in smaller cities and towns is to build a single large school to accommodate pupils from a wide territory, and we see no other feasible plan.

Another force — and a very great one — acting against the specialized high schools is the belief that during the first year or two of the high-school course the program of studies should be practically the same for all pupils, differentiation into groups taking place only after each pupil has tried every one of the fundamental lines of study and been given an opportunity to "discover himself." The high school of the future must have breadth.

The manual-training high school of today is in its best manifestations, we believe, the high school of greatest breadth, but we believe also that the evolution of the high school *par excellence* is not yet completed. We confidently look forward to a type of high school within the means of every large town or small city which shall be just as broad in fundamental lines of study as is the best manual-training high school of today. It will not carry all these lines of study as far as does the present manual-training high school, but they will all be there in perhaps better balance than they are now in the manual-training high school. We confidently look forward to the prevalence of a type of high school that will give manual training and drawing as much of a representation as it gives to the sciences. We believe each school will have a place for woodworking, for metalworking, for domestic art, and for drawing, as large as for chemistry, physics, biology, and domestic science. We do not, however, believe that very much more should be expected in the direction of manual training. When this has been done and these have been provided for in accordance with the size and wealth of the community, we believe that reasonable demands upon the public schools for general secondary education in these directions will have been met.

This means that the high school *par excellence* in a small city would contain two or three laboratories for science, including domestic science, a shop for woodworking, with some space for metalworking, a room for the domestic arts, and a drawing room. A high school in a somewhat larger city would contain an additional shop or two and another drawing room, also one or two more laboratories. The high school *par excellence* for a large city would be, not a manual-training high school, or a Latin high school, or an English high school, or a commercial high school, but a broad general high school covering the fundamental lines of instruction in all these, and carrying each as far as the conditions make it possible and desirable, but always keeping a breadth and balance of opportunity which is not possible in a school with a meager course of study or in a school that is highly

specialized. We believe that in such a scheme as this lies the future of manual training for a very large majority of our high schools.

At the session of the Illinois Society for Child-Study held at the University of Chicago, May 3, Mr. Fred. W. Smedley, child-study specialist of the Chicago public schools, gave the results of his investigations with reference to ambidexterity. He called attention to the fact that a very large per cent. of the pupils who stand well in their school work are right-handed, and then he stated that his investigations show that a surprisingly large per cent. of those who are defective in speech are left-handed. In the John Worthy School — which, if not for the criminal class, is more nearly that than anything else — the boys more nearly approach ambidexterity than in other schools. Mr. Smedley reaches the conclusion that unidexterity is the ideal condition, and that teaching ambidexterity is teaching contrary to the law of life. He believes that teaching ambidexterity is likely to interfere with the child's best development. Mr. Smedley has promised to contribute an article to the MAGAZINE, giving more in detail the results of his investigations.

REVIEWS.

BOOKS.

Manual Instruction in France and Switzerland. By William Lewis. Printed at Cambrian News Office, Aberystwyth, Wales. $7\frac{1}{4} \times 4\frac{3}{4}$ inches; pp. 50; price (through A. C. McClurg & Co., Chicago), $1. — Some of our readers will remember that in 1893 five women were sent from England to America to study educational systems and methods in the United States. These five were principals of secondary schools for girls and lecturers on education in colleges for teachers. They were sent here by the trustees of the Gilchrist Educational Fund, having been awarded traveling scholarships. The results of their investigations were published in four volumes.

In 1895 the trustees of this same fund established a traveling scholarship in connection with the University of Wales. The following year it was awarded to William Lewis, head master of the intermediate and technical school at Llanelly. The fruits of that award are in the volume before us. The book is a clear, compact, and comprehensive report. It is the result of much personal observation and research, and is not made up of mere impressions gathered on a three-weeks' tour. It is superior to any book or report we have seen on the subject. While the purpose of the book is to help to an understanding of the manual-training and trade instruction in the schools of France and Switzerland, it also describes the different classes of schools in these countries, thus enabling one to understand the place occupied by the manual instruction. It also deals with details of methods of instruction. It is illustrated with a few line cuts of drawings of exercise pieces, and by eleven full-page half-tones of buildings, equipments, and the work of pupils.

The following is quoted from the chapter on manual instruction in Switzerland:

"It is only in Switzerland that I have found a just and broad enunciation of what I consider manual instruction should be, and I cannot do better than quote here a passage from M. Bouvier's pamphlet on the nature and methods of manual instruction taught in his school, wherein he takes a broad, practical, and comprehensive view of the subject:

"'Manual training is not the beginning of apprenticeship; it aims at no special calling; it does not even aim absolutely at the dexterity of the hand or the accuracy of the eye. These qualities will be the necessary result of an instruction, methodically and intelligently given; they are not the main purpose. Manual training is practical instruction, the essential object of which is to assist other branches of instruction, to render clear, manifest, and precise the ideas which these latter furnish in enabling them to be applied and realized in the construction of objects chosen with this end in view.

"'From this way of looking at manual training the method which should be adopted evolves itself. The master has to give less attention to the exactness of the execution than to the manner in which the pupil proceeds, and to the ideas which direct him in his work.

"'Of course, the management of tools will not be neglected. Care must be taken that the pupil shall not acquire bad habits, that his position should be correct, that he should act with prudence and economy, and that he should calculate the range of his movements. But all this is secondary. What is important is that the pupil should be convinced that no construction should be executed by accident from a vague and indefinite conception, but from a carefully prepared and definite plan: that he should understand in what manner the ideas which he has received enter into the work of his hands; in short, that he should accustom himself always to proceed methodically, and know how to utilize what he has learned.

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"'Such are the intelligent results at which the master ought to aim in his instruction. He will give every care to the so-called material construction; he will demand from the pupil what he can reasonably give, but he will not go beyond that. He will not forget that manual dexterity is a matter of long practice, and that his business is not to teach him to saw or to plane, so much as to learn to put ideas into application and to generate the habit of intelligent and reflective work. Besides, if the lessons have been given as they should be, if the master has learned to make the most of the various resources which an instruction, already very attractive, offers in itself to the pupils, it is certain that they, without any compulsion, will bring all their care to the execution of the work. They will have pleasure in seeing realized, under a form as perfect as possible, the work which their imagination had foreseen and of which their intelligence, aided by their knowledge, had prepared the plan.'"

A Course of Instruction in Wood-Carving According to the Japanese Method. By Charles Holme. The Studio, London, England. 7¼ × 5¾ inches; pp. 106; price (through Gustav Stechert, importer, New York), $0.90.—"In Japan the art of wood-carving has probably been carried to a greater degree of perfection than in any other country in the world. Coincident with the progress of civilization and the development of the arts in the West, the sculpture of marble and stone assumed an importance proportionate to the extent to which those materials were employed in architecture.

The physical characteristics of Japan — the prevalence of earthquakes and earth-tremors — which prohibited the use of heavy materials for building purposes, have, at the same time, ordained the employment of wood as best adapted to resist these scismic disturbances. Cottage and palace, barn and temple, are, therefore, mainly constructed of it, and wooden temples exist in Japan, built as far back as the ninth and tenth centuries of our era, which are still in sound condition and exhibit in a far less degree the ravages of time than do the stone buildings of the same age in Europe. Whether wood or stone be the more 'noble' material does not here concern us; but that wood has been rightly selected for use in Japan there can be no manner of doubt; and the result has been to give the wood-carver a position in the arts equivalent to that enjoyed by the mason in the West. As much respect is probably paid in Japan to the memory of the eminent wood-carver 'Hidari' Jingoro, whose works may still be admired and wondered at in many important buildings in that country, as is bestowed in Europe upon the achievements of Phidias, albeit that the essential characters of the great arts of Japan and Greece are based upon widely differing philosophies."

Thus the author introduces a book that is full of interest to persons who are studying the art of decorating wood. The frontispiece and the three other reproductions of photographs of doors, gateway, frieze, and ceiling decorations in the temple of Nikko in Tokio suggest the marvelous perfection to which the wood-carver's art has attained in Japan. The main purpose of this book, however, is not to set forth the glories of Japanese carved ornament and architectural decoration, but to present, somewhat in detail, the elementary parts of the course of instruction in wood-carving given at the School of Fine Arts of the University of Tokio, a school established to revive the old-time crafts of Japan. It contains brief descriptions of tools and processes, and line cuts of about seventy of the exercise pieces contained in the three-years' course of instruction at Tokio. These range from the cutting of a straight line lengthwise the grain of a block of wood to modeling fungi, flames, and cloud-forms. They are arranged in such perfect sequence, and are so "abstract" that certainly no up-to-date manual-training teacher in America would copy them as exercise pieces, yet to some teachers and to some pupils these same exercise pieces will, no doubt, suggest forms of decoration which may with propriety be applied to useful articles.

The following have been received, some of which will be given more extended notice in the October number:

First Years in Handicraft. By Walter J. Kenyon. The Baker & Taylor Co., New York. Price, $1.

Line and Form. By Walter Crane. George Bell & Sons, London. Price (through G. E. Stechert, New York), $3.75.

Sloyd Bulletin, June, 1901. Published by the Sloyd Training School, Boston, Mass.

Proceedings of the Eastern Manual Training Association, 1900. Foster H. Irons, Saginaw, E. S., Mich., Secretary.

Address at Laying of the Corner Stone of Cupples Hall No. 1, Washington University, St. Louis, Mo. By Dr. Calvin M. Woodward.

Proceedings of the Department of Superintendence of the National Educational Association, 1901. Irwin Shepard, Winona, Minn., Secretary.